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THE Association was organized in Boston, Mass., on June 21, 1882, with the object of providing its members with means of social intercourse and for the exchange of knowledge pertaining to the construction and management of water works. From an original membership of only TWENTY-SEVEN, its growth has prospered until now it includes the names of over 1000 men. Its membership is divided into six classes, viz.:

A Member shall be an officer or employee of a public or private water works, an engineer, chemist or other person qualified to aid or interested in the advancement of knowledge relative to water works.

An Honorary Member shall be a person of acknowledged eminence in some branch of water supply or of engineering.

A Junior shall be not less than eighteen years nor more than twenty-five years of age, a student or connected with water supply work.

An Associate shall be either a person, firm or corporation engaged in manufacturing or furnishing materials or supplies for the construction or maintenance of water works.

A Corporate Member shall be either a Water Board, Commission, Company or Municipal Corporation.

The Initiation fees and annual dues are as follows:

	Initiation Fees		Annual Dues
Members	$ 5.00	Members	$ 5.00
Juniors	1.00	Juniors	2.00
Associates	10.00	Associates	25.00
Corporate Members	10.00	Corporate Members	10.00

This Association has at least eight regular meetings each year, of which five are held in Boston, one in northern New England, one in southern New England, and one, the annual convention, held in September or October on such date as the Executive Committee may designate.

HIDDEN REINFORCEMENT

Great grandmother used hidden reinforcement to restrain her figure; Lock Joint prestressed pipe design uses much the same principle to restrain the high internal pressures in present day water transmission lines. Lock Joint's hidden reinforcement consists of high tensile wire wrapped under high uniform tension around the core of the pipe.

Can you guess how many miles of such wire were used in the 120,000-foot 66″ Lock Joint Prestressed Concrete Embedded Cylinder pipeline for Wichita's water supply system? Find the answer in the picture above.

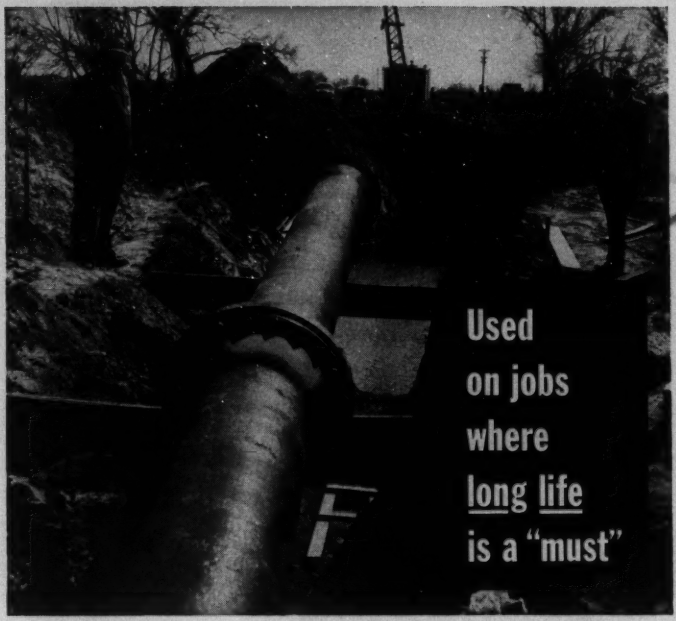
Samples of all such high tensile wire used in the production of Lock Joint prestressed pipe not only are certified by mill tests, but also must meet the exacting standards demanded by rigorous tests to which they are subjected in Lock Joint's own laboratory. This is only one of the many quality control measures employed in every phase of the manufacture of Lock Joint Pressure Pipe to assure the customer the finest product obtainable.

LOCK JOINT PIPE CO.

East Orange, New Jersey

Sales Offices: Chicago, Ill. • Columbia, S. C. • Denver, Col. • Detroit, Mich. • Hartford, Conn. • Kansas City, Mo.

Pressure • Water • Sewer • REINFORCED CONCRETE PIPE • Culvert • Subaqueous



Installing cast iron mechanical joint pipe across river at Salina, Kansas, for sewer main.

When an installation, once completed, should be as trouble-proof as planning and materials can make it — engineers rely on cast iron pipe. It has high beam-strength, compressive-strength and shock-strength. Its effective resistance to corrosion ensures long life, underground or underwater. These are reasons why cast iron pipe is so widely used for water lines in tough terrain, pressure and outfall sewers, river crossings, and encased piping in sewage treatment and water filtration plants. Cast Iron Pipe Research Association, Thos. F. Wolfe, Managing Director, Suite 3440, Prudential Plaza, Chicago 1, Ill.

This 123-year-old cast iron water main is still in use in the distribution system of St. Louis, Mo.

®

CAST IRON

CAST IRON PIPE SERVES FOR CENTURIES

The World's First Sealed Register Water Meter

Hermetically Sealed Register
Never Fogs—Always Easy To Read

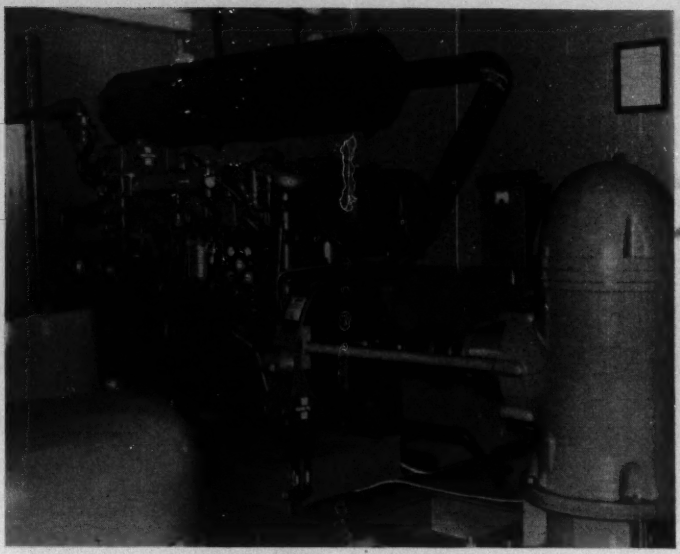
All the register parts and reduction gearing are hermetically sealed in this stainless steel housing having a thick, heat treated glass window. Condensation, dust and corrosion are permanently excluded. A powerful magnetic drive eliminates the need for a stuffing box.

Everything about the Rockwell Sealed Register Water Meter makes history. Makes sense, too. It's the first water meter to operate successfully without a troublesome stuffing box. A simple, powerful magnetic coupling does this work—without friction, binds or leaks. The hermetically sealed register forever eliminates condensation problems that often make ordinary meter registers hard to read. Ends corrosion problems, too.

Even Rockwell has never made a more accurate meter. It requires less maintenance than any meter you have ever used. And it's tamperproof. The cost? No more than an ordinary meter—actually less than meters now fitted with special types of registers. Write for bulletin. Rockwell Manufacturing Company, Pittsburgh 8, Pa.

Rockwell Sealed Register Water Meter

With Powerful Magnetic Drive



Diesel Engine Driven Pump Unit at Lakeville Pumping Station of Taunton, Massachusetts, Water Supply System

Designed and engineered by Fay, Spofford and Thorndike, Boston, Massachusetts, the new equipment at Lakeville Pumping Station includes a Cummins Model NRTO engine-driven Peerless pump, with a variable speed capacity of eight to ten million gallons per day, as stand-by for an electric motor driven pump of eight millions capacity per day. The new equipment was installed in May of this year.

In July, when lightning struck the station for the second time in four years, the engine was called on to take over on a 16-hour-per-day basis.

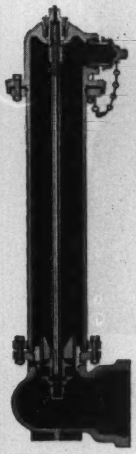
CUMMINS DIESEL OF NEW ENGLAND, INC.

201 Cambridge Street
ALLSTON 34, MASSACHUSETTS

205 Lincoln Street
SOUTH PORTLAND, MAINE

720 Union Street
WEST SPRINGFIELD, MASSACHUSETTS

FOR A LONG-LASTING LOW-COST INSTALLATION

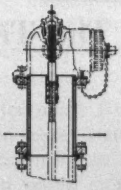


The R. D. WOOD Standard Swivel-Joint Hydrant

This hydrant will give you reliability, strength and permanence at lowest possible cost. It assures your community of water delivered at top pressure, because internal friction is reduced to the minimum. Generous size of all water carrying areas, carefully rounded changes of diameter, and scientifically tapered nozzleways all contribute to reducing friction well below A.W.W.A. specifications.

EXTENSION PIECE

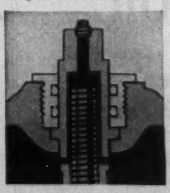
The extension piece may be inserted (without shutting off water supply) between hydrant head and barrel or between barrel and elbow.



BREAKABLE FLANGE AND STEM COUPLING

Available at slight extra cost and designed to snap under a blow which would otherwise smash the hydrant beyond repair, thus depriving the community of fire protection for a dangerous length of time. Flange and stem coupling can be replaced in a jiffy *without excavating*.

R. D. Wood Hydrants are available with mechanical joint or flange-type pipe connections. Also with O-Ring Seal when specified, as shown below.

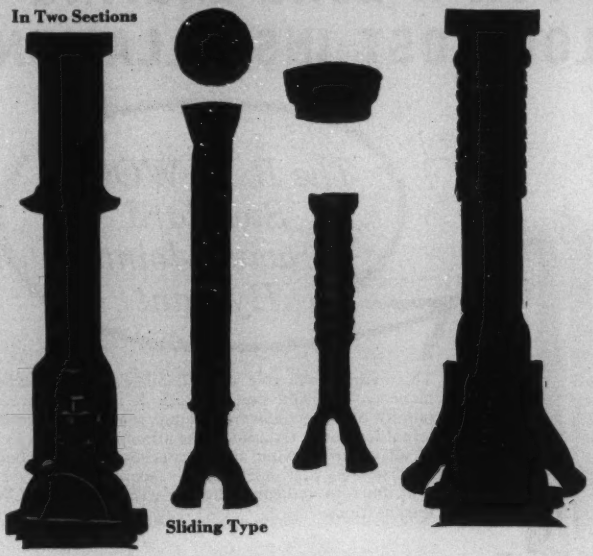


R. D. WOOD CO.

Public Ledger Building, Independence Square, Philadelphia 5, Pa.

Manufacturers of Mathews Hydrants and "Sand-Spun" Pipe (centrifugally cast in sand molds)

In Two Sections



Sliding Type

The Three "Bigs" in Buying

1. *Standardization*
2. *Dependability*
3. *Quick Delivery*

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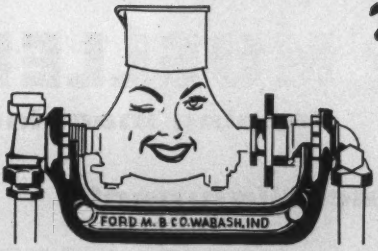
CORPORATION

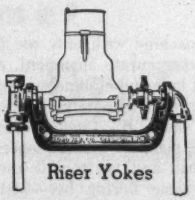
Genuine Buffalo Cast Iron
Service. Valve. Roadway and Meter Boxes
Manhole Frames and Covers

CULPEPER, VIRGINIA



Meters Play EASY-TO-GET

when they wear FORD YOKES



Riser Yokes

Angle Yokes

Straight Line Yokes

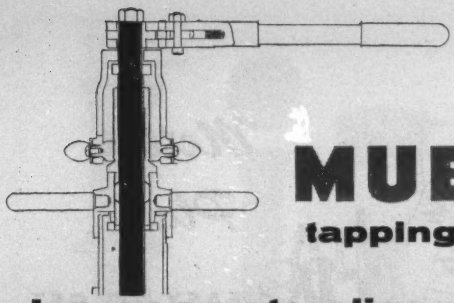
Dress a meter up in a Ford Yoke and see what a difference it makes. No more fighting misalignment of pipes or wrong spacing between couplings. Just an easy twist of the wrist and you've got your meter.

Ask your meter man. He'll tell you that an easy-to-get meter can be kept more accurate so that it lasts longer and earns more revenue. Millions of Ford Yokes are in use.

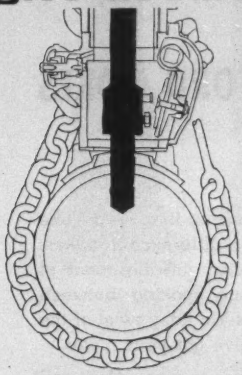
Send for the Ford Catalog and learn more about getting your meter's worth.

FORD FOR BETTER WATER SERVICES

THE FORD METER BOX COMPANY, INC. Wabash, Indiana



MUELLER®
tapping machines
give accurate alignment



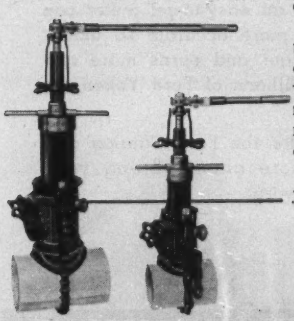
for *simple, trouble-free operation!*

Use a tapping machine with only *one* boring bar and guarantee accurate alignment, assure uniformly tapped hole and eliminate possibility of cross-threading your corporation stops.

Mueller "A-2" and "B" Tapping Machines drill and tap the main in a single operation. The combined drill and tap tool is then replaced—on the same boring bar—with the corporation stop to be inserted. Alignment is automatic and stop is inserted quickly and efficiently!

Difficulties, such as a defective thread or a tool or stop of the wrong size, are easily overcome with Mueller Tapping Machines. A flop valve between the two pressure chambers permits the boring bar and upper portion of the machine to be removed at any time during the drilling and tapping or inserting operations.

Contact your Mueller Representative, refer to your Mueller Catalog W-96 or write direct today.



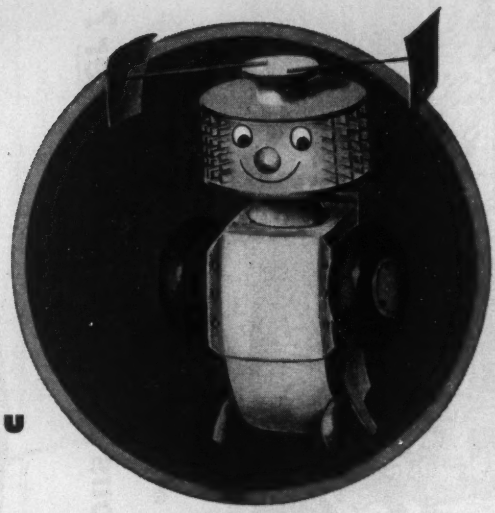
"A-2" Machine inserts or removes corporation stops 1" to 2" pipe plugs 1" to 4"

"B" Machine inserts or removes corporation stops ½" to 1" pipe plugs ½" to 2½"

MUELLER CO.
DECATUR, ILL.

Factories at: Decatur, Chattanooga, Los Angeles, In Canada: Mueller, Limited, Sarnia, Ontario

Since 1857



have you met

Dr. Centriline . . .

If not, you should! He can do things for you . . . like making your job easier and saving you money. He's a versatile and somewhat ingenious many-armed creature who specializes in cement-mortar lining the inside of pipes. And he's done this to over 4 million feet of pipe, too—eliminating corrosion and tuberculation . . . increasing flow capacity . . . reducing leakage . . . slashing pumping costs . . . and adding years and years of pipe life. If you'd like to learn more about Dr. Centriline and how he can work for you, just write or call for one of our descriptive brochures.

CENTRILINE CORPORATION

A subsidiary of the Raymond Concrete Pile Company

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NEW YORK, N. Y.

Branch Offices in Principal Cities of the United States, Canada and Latin America

• CEMENT-MORTAR LINING OF PIPES IN PLACE •

Soil conserved . . .

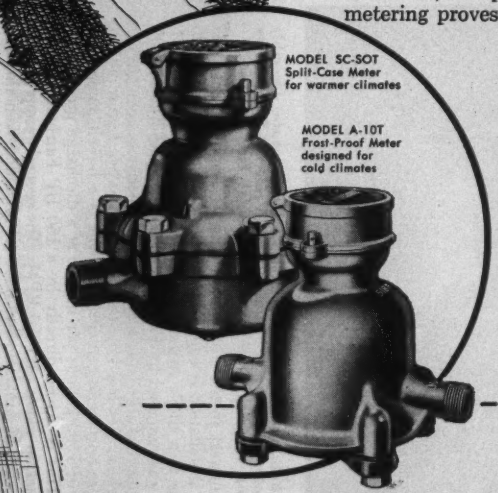
but how about our most precious possession . . . water?

Stop water waste . . . start water conservation now—with Badger Meters

We are paying billions for land conservation and reclamation because our very life depends upon it. And we are lucky — there's land to reclaim. But what about

you can make for your community's future. Badger Meters replace impractical and unjust flat rates with a fair-share, fair-pay program for everybody. Accurate metering proves to consumers that the best things in life are far from free. *That's* when water waste stops — conservation begins. What's more, Badger Meters put your water system on a profitable, business basis.

Choose the specific meters you need from the complete Badger Meter line of outstanding disc, turbine and compound meters — 5/8-inch through 12-inch sizes. They're precision-engineered, using the finest alloys for lasting, accurate service. Call a Badger Meter representative for facts — or write for literature *today*.



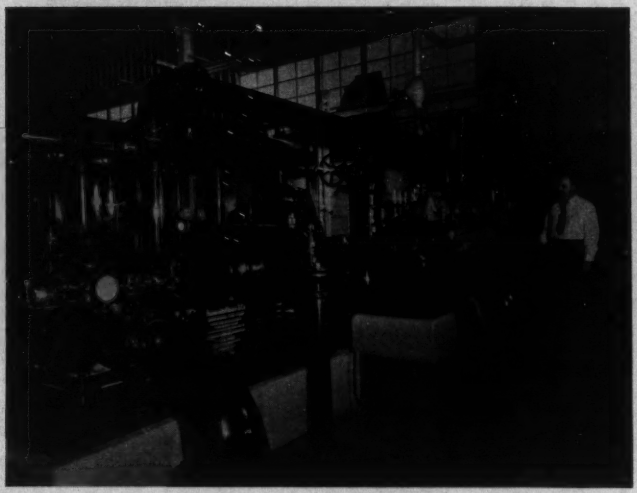
Water is vital

Badger Meters have conserved it better for over 50 years.

Badger Water Meters

BADGER METER MFG. CO. • 2371 North 30th Street
Milwaukee 45, Wisconsin • OFFICES IN PRINCIPAL CITIES

ANOTHER FAIRBANKS-MORSE LEADER



Complex fire fighting system guards world's largest Auto Assembly Plant. Ford Motor Company at Mahwah, N. J. Protected by extensive system including two Fairbanks-Morse Centrifugal Fire Pumps.

One of the newest in the Ford chain of 16 assembly plants, the giant Mahwah installation is capable of turning out more than 1,000 cars and trucks in a single two-shift working day.

The system was designed by Ford engineers in collaboration with consulting engineers R. F. Giffels and V. E. Vallet.

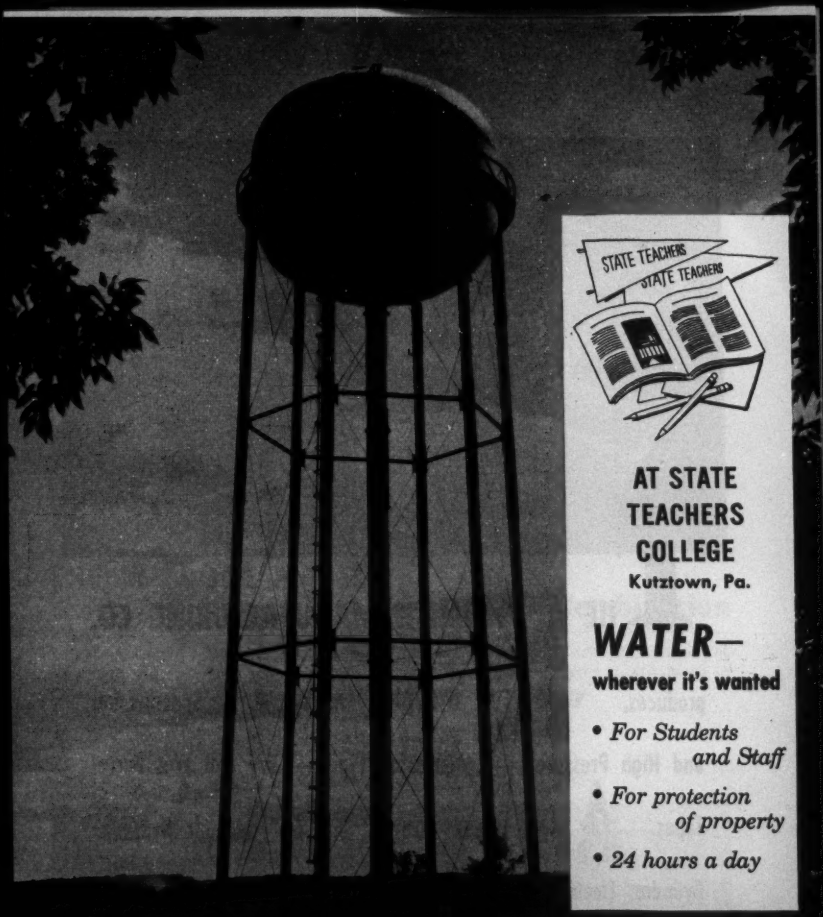
The pumps chosen for this important service are two Figure 5814F Fairbanks-Morse horizontal centrifugals. One is a 6-inch pump with rated capacity of 1500 gallons per minute at a discharge pressure of 125 pounds. This is driven directly by a 150 HP Fairbanks-Morse type QZK induction motor at 1770 RPM. The second pump is even larger, an 8-inch F-M unit rated at 2500 GPM and driven through power transfer gears by a pair of 6-cylinder diesel engines. Actually there are three pumps, the third being a 1-inch Figure 5592- F-M centrifugal driven at 3475 RPM by a 15 HP motor.

Write or telephone to:

FAIRBANKS, MORSE & CO.

178 Atlantic Avenue **Boston 10, Massachusetts**

Telephone: LAfayette 3-3600



AT STATE TEACHERS COLLEGE
Kutztown, Pa.

WATER—
wherever it's wanted

- *For Students and Staff*
- *For protection of property*
- *24 hours a day*

PITTSBURGH-DES MOINES ELEVATED STEEL TANKS

Pittsburgh-Des Moines water storage with a "college degree" for dependability and economy serves this Eastern Pennsylvania school assignment. Built for the General State Authority, the double-ellipsoidal PDM elevated steel tank has a capacity of 300,000 gallons, a diameter of 44 ft and head-range of 30 ft 9 in. It is supported on a tubular column tower, 114 ft 6 in. to bottom of capacity.

Let us quote on your water storage requirements. Write for our latest Catalog.

PDM
ELEVATED STEEL TANKS

PITTSBURGH • DES MOINES STEEL CO.
Plants at PITTSBURGH, DES MOINES, SANTA CLARA, FRESNO, and CADIZ, SPAIN

Sales Offices at:

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THE A. P. SMITH MANUFACTURING CO.

produces, FIRE HYDRANTS A. W. W. A. Specification and High Pressure — Compression Type — Dry and Wet Barrel Types. GATE VALVES sizes 2" thru 66", Manual, Hydraulic Cylinder, Electric Motor Operated for Low, Medium and High Pressure Service. INSERTING VALVES sizes 4" thru 48" for inserting under pressure. TAPPING SLEEVE AND VALVES sizes 4" x 2" thru 60" x 48" for branch connections under pressure.

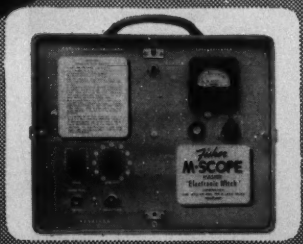
42

THE A.P. SMITH MFG. CO.

EAST ORANGE, NEW JERSEY

New!

TIME-$AVING COMBINATION LEAK DETECTOR-PIPE LOCATOR



THE M-SCOPE MASTER
Electronic Witch Combination

You're looking at the much-talked-about **NEW** M-Scope . . . the only dual-purpose that detects leaks **and** locates pipe. Its rugged, highly efficient electronic circuit, plus ease of use and portability, make this instrument one of the most welcome contributions to the water works industry.

Quick Facts

LOCATING A LEAK AT THE VALVE

FINDING A LEAK UNDER PAVEMENT

ONE MAN OPERATION

LOCATING A SERVICE

For greatest convenience and reliability, the M-Scope MASTER is equipped with a **built-in battery tester** for instant checking of battery condition in the field or elsewhere.

WRITE TODAY FOR SPECIFICATIONS AND PRICE!

PIPE LINE EQUIPMENT

JOSEPH G. POLLARD CO., INC.

PIPE LINE EQUIPMENT

PIPE LINE EQUIPMENT

Place your next order with POLLARD

It pays from POLLARD It's the Best in Pipe Line Equipment

NEW HYDE PARK • NEW YORK

Branch Offices: 964 Peoples Gas Building Chicago Illinois
333 Candler Building Atlanta Georgia

Town of North Andover — New Lake Cochichewich Pumping Station

Pictured above are two De Laval two-stage centrifugal pumping units installed in a modern completely automatic water works station. Design conditions of each unit are 1400 GPM against 280 ft. TDH. Gasoline Engine auxiliary drive is included on one unit for emergency operation.
Our contract included installation of pumps, chemical equipment, intermediate piping and electrical control equipment.
Weston & Sampson, Consulting Engineers, prepared the plans and specifications, and supervised the installation of all equipment.

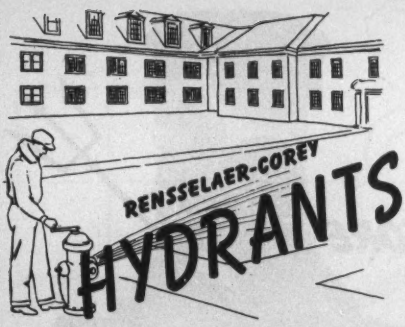
TURBINE EQUIPMENT COMPANY OF NEW ENGLAND

80 Federal Street **Phone LIberty 2-5993** **Boston 10, Mass.**

New England Representatives for

DE LAVAL STEAM TURBINE COMPANY

TRENTON, NEW JERSEY

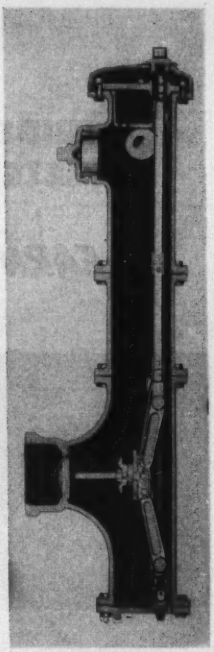


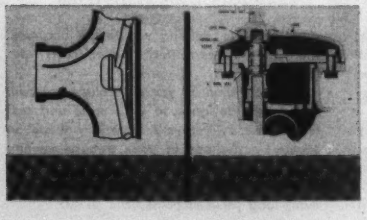
This is the hydrant that has been the standard of excellence in hundreds of cities for many years. Inspectors, maintenance men and fire chiefs, all have their reasons for endorsing the Rensselaer Corey Hydrant.

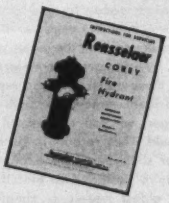
The illustrations show the clear-flow design which insures low head loss and maximum flow. Maintenance men like the simplicity of design and the speed of removing, inspecting and replacing the working parts as a single unit.

This hydrant opens with the pressure, is easy to operate and cannot stick. No digging for repairs, or for standpipe breakage. Now available with any type connection and "O" Ring seal.

18







Ask for Bulletin "G"

LUDLOW & Rensselaer

LUDLOW RENSSELAER VALVES & HYDRANTS

Since 1861 THE LUDLOW VALVE MANUFACTURING CO. Troy, N. Y.

TRIDENT METERS

EARN MORE

...COST LESS

It takes money to maintain the water supply your community expects. It's vitally important to make sure all the water pumped is paid for . . . by using accurate meters . . . and by keeping these meters in good repair.

Trident meters are built to hold accuracy longer, so you receive all the revenue you should. They're built to be easier to repair, so your shop time and expenses are cut down. They're designed so that the newest parts fit the oldest meters . . . simplifying your repair parts problem, helping you to get accurate, thoroughly modern performance from your oldest meters.

For more than 50 years, Neptune has built fine meters designed to earn more and cost less. Many 50-year-old Tridents are still in service . . . perhaps in your own community . . . living proof that the Tridents you buy today will be a credit to your water system for many long years to come.

NEPTUNE METER COMPANY
19 West 50th Street • New York 20, N. Y.

NEPTUNE METERS, LTD.
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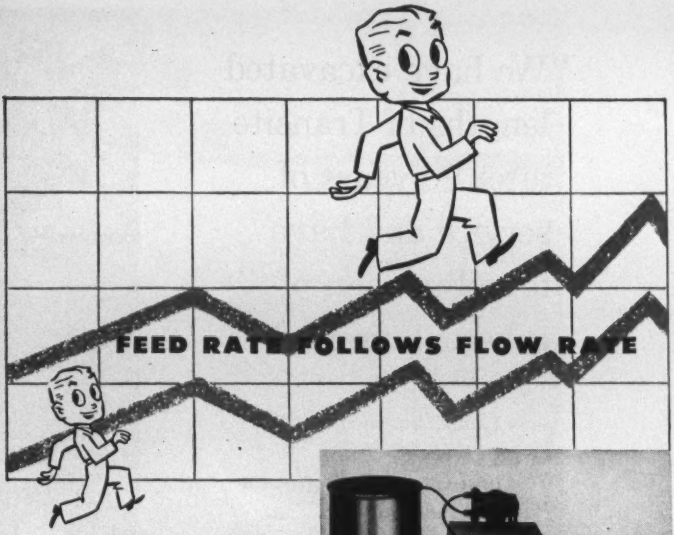
neptune



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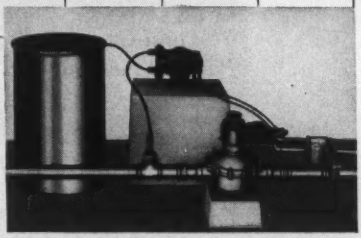

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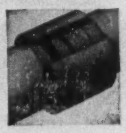

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ORGANIZED 1882

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CHLORINE AND CYLINDER HANDLING

BY RICHARD A. KNEF*

[*Read January 17, 1957.*]

Liquid chlorine is commercially available in vertical cylinders holding 1 to 150 lb, in 1-ton containers carried on multi-unit cars or motor trucks, and in single-unit tank cars of 16, 30 and 55 tons. Since most of the water works use cylinders of the 95- to 150-pound class, my discussion will be only on them.

Maintaining, testing, loading, shipping and labeling of chlorine cylinders in the United States and Canada are subject to regulations respectively by the Interstate Commerce Commission or the Board of Transport Commissioners for Canada. It is the responsibility of each person supervising the handling of chlorine cylinders to be in all respects familiar with such regulations and to require compliance with them.

Responsibility for such judgments of safety rests with the operator and foreman, who learn very accurately from many prior inspections what constitutes a safe chlorine cylinder. In the final analysis, therefore, it is essential that the following tasks be performed and supervised by personnel who are responsible, experienced, and aware of the possible results of errors.

Receiving Empty Cylinders

When the empty cylinders are returned from the customer, the serial number of each is checked against the shipping ticket and checked off. The I.C.C. requires a continuous record of each cylinder, where it is sent, how long there, when it is returned and when it was tested last.

*Fields Point Manufacturing Corp., Edgewood Station, Providence 5, R. I.

The operator then promptly inspects the package to ascertain if:

1. It needs to be tested—once every 5 years.
2. It has nicks or dents—if so, discarded.
3. If cylinders should be returned partially full.

Next, the cylinder is vented into a vacuum line to insure it is handled as an empty package.

Next, the valve is removed and a visual internal inspection is made of each cylinder, by inserting a candle-type lamp into each container. The operator checks for pitting, corrosion, scale, wetness, residue, foreign matter or any condition which might indicate the package to be unsafe for use, or which might contaminate the chlorine to be loaded into it. If a package shows any of these defects, it is put to one side for steaming and cleaning by inverting cylinder over an open steam pipe for several minutes, and then blown out with dried air until all moisture has been removed.

If visual inspection shows no foreign matter, or after cylinder has been cleaned, a new or reconditioned valve is inserted.

Reconditioned Valves and Fusible Plugs

To recondition a valve it is first completely dismantled—the two packing rings are discarded—the cap, packing gland, monel stem, fusible plug and lead gasket are put to one side. The valve body is steamed and reseated, if it is found to be in good condition after inspection. Each monel stem is reground and, if pitted too badly, replaced with a new one. The fusible plug is then replaced in the valve body, if found to be good, while questionable plugs are replaced. (The lead in the plug will melt at 160°F.) Next, new packing rings and gasket then are installed, as well as a valve cap. After testing for leaks with air pressure, the valve is reconditioned and ready for use.

Next, cylinders are scraped and repainted with a special paint that can be removed easily. Each manufacturer has his own particular color combination for the cylinders. Ours happens to have a gray body with a red top; another might have an aluminum-colored paint. As a matter of fact, one day a sewage operator, not a water man, asked me where he could buy those aluminum-colored cylinders, be-

cause he thought they would be a lot lighter to handle. But, no matter what color your chlorine cylinders happen to be when empty, each container will weigh 90 to 120 lb, depending on the newness of the cylinder.

Filling the Cylinder

The cylinder is placed on a scale, where the tare weight is checked and marked on the cylinder. A new tare weight is recorded when the variation from the previous recorded tare weight exceeds 2 lb.

The loaded cylinder has both a liquid phase and a gas phase. The loading density of any container is limited by regulations, to allow about 12% gas space in a full container at 68°F., as the temperature affects both the vapor pressure and the volume of the liquid chlorine.

After loaded packages have been determined to be free from leaks for 24 hours, the outlet caps are screwed in place. A lacquer is applied to valves, and valve-protection caps are put in place, proper tags are applied, and the cylinder is ready for shipment.

These cylinders have been checked and rechecked to provide a container that can be handled safely at its point of application. As a result, tremendous quantities have been handled by our company in the last 40 years with very few mishaps.

CONTINUING RESEARCH RELATED TO WATER AND SEWAGE TREATMENT†

BY H. V. MOSS*

[*Received January 22, 1957.*]

At the convention of the Association of American Soap and Glycerin Producers in New York on January 27, 1956, Frank J. Coughlin (1), as Chairman of the Technical Advisory Committee of the Association, reviewed some of the problems associated with synthetic detergents in sewage and water treatment. He reported the initiation of research by the AAS&GP at four universities, as well as the creation of two sub-committees to study analytical methods for accurate determination of alkylbenzene sulfonate and phosphates present in low concentrations in water and sewage.

For better coordination of technical activities within the Association on these investigations, some of the previously existing committees have been reorganized and additional ones have been created. The most significant organizational change has been the formation of a Steering Committee, composed primarily of members of the parent Technical Advisory Committee; functions of this group are adequately described by the official title of this group: "Research Committee of the Technical Advisory Committee."

Today we will endeavor to review briefly progress that has been made without being able at this time to give a comprehensive report on the various university research projects, pending completion and ultimate publication of the work.

Effect of Phosphates on Water Treatment

It is known that modern synthetic detergents contain as relatively major constituents, inorganic condensed phosphate salts in the form of alkali tripoly- and pyrophosphate. These salts possess unique

†An abbreviation of a report read at the annual meeting of the Association of American Soap & Glycerin Producers, Inc., New York, N. Y., Jan. 25, 1957, by the Vice-Chairman of the Technical Advisory Committee.

*Director of Product Quality, Inorganic Chemicals Div., Monsanto Chemical Co., Lindbergh and Olive Street Rd., St. Louis, Mo.

properties that enhance functional performance of detergent formulations.

It has been suspected that condensed phosphates, emanating from domestic waste-wash-waters, could ultimately find their way through surface streams into water-treating plants and, because of the inherent peptizing and dispersing properties of the condensed phosphates, interfere with normal coagulation and sedimentation operations practiced in conventional water purification.

Among investigations in this area are those of W. L. Lea et al. (2), R. S. Smith et al. (3), and Howells & Sawyer (4). Lea et al. found it possible to remove most of the soluble phosphate from sewage-plant effluent by the use of common coagulants and investigated mechanisms involved in the removal of phosphate from solution. Smith and co-workers found in laboratory experiments that "complex" phosphates in low concentrations interfere with alum coagulation, but that this interference can be overcome by increased alum dosage. Howells & Sawyer found sodium tripolyphosphate and tetrasodium pyrophosphate, when present in concentrations of 2 to 10 ppm in freshly prepared solutions of a natural water (which is presumed by this author to be relatively free of hardness), to interfere with alum coagulation, which interference could be overcome by heavier alum dosage.

Except for the work by Lea et al., who employed sewage effluents with naturally contained phosphates, it should be observed that the other investigators cited conducted experiments wherein the condensed phosphates were added as such.

It is known that all inorganic condensed phosphates are subject to hydrolytic degradation to simple orthophosphates, which do not possess to the same degree the properties afforded by the parent compounds, and that the rate of degradation is affected by several environmental factors [Van Wazer et al. (5)]. Furthermore, Karl-Kroupa et al. (6), in a presentation before the Division of Water, Sewage and Sanitation at the spring ACS meeting in Dallas (1956), reported the accelerating effect of various common living organisms upon degradation of tripolyphosphate.

It is therefore possible that complex phosphates in synthetic formulated detergents are appreciably altered in their circuitous and

varied exposure from their use in the home to the raw supply of a water-treating plant.

Accordingly, the research project sponsored by the AAS&GP at the University of Illinois, under the direction of Professor Jess C. Dietz, has the following major objectives:

First—to establish the levels and kinds of phosphates normally present in typical surface waters that are known to receive sewage-plant effluents and that serve as raw water supplies for water-treating plants.

Second—to determine whether complex phosphates persist as such or, through their passage through sewage plants, surface streams and ultimately to water-treating plants, are decomposed to simple, relatively inactive orthophosphates.

Third—if complex phosphates do persist and are found to be present in raw water supplies, to determine what effect polyphosphates have on water-purification operations when present in concentrations normally found in surface waters.

From a survey still under way of streams in the State of Illinois that are known to receive sewage effluents upstream from the sampling points, it is already indicated that the concentration of condensed phosphate present in surface waters, when determined by the analytical method under investigation by the Phosphate Sub-Committee of the AAS&GP (whose activities are reported later), will average significantly under 0.5 ppm, and that rarely will condensed phosphate concentration exceed 1.0 ppm.

Interesting is the indication that phosphates present in sewage effluents already consist largely of orthophosphate.

Not surprisingly, it also begins to be apparent that phosphates in surface waters originate in a large measure from other sources than sewage effluent, among which a significant proportion appears to come from land drainage.

In laboratory investigations at the University of Illinois on the stability of complex phosphates in natural waters, degradation of the phosphates has been demonstrated; this supports the hypothesis that condensed phosphates do not persist interminably in natural waters.

Despite the present indications of innocuous concentrations of

complex phosphates in raw waters, investigations are under way to determine in a pilot plant the effects of polyphosphates in normal and maximum concentrations encountered in raw water supplies upon flocculation and sedimentation processes employed in water purification.

It is expected that with expiration of the existing contract at the University of Illinois in June, 1957, the objectives of the project will have been attained.

Analytical Methods

It has been and still is realized that accurate and relatively simple methods for analysis of ABS and phosphates in low concentrations in surface waters and sewage are an essential tool in furthering investigations of the types that have been described, in addition to providing other investigators in these areas with better yardsticks to use in their work.

In last year's report at the AAS&GP convention Frank Coughlin told of the existence of two committees engaged in developing analytical methods—one for ABS and one for phosphates.

The sub-committee for Analysis of ABS, whose Chairman is now Ralph House of the California Research Corporation, has continued its diligent work and has come up with a method whose details I will not dwell upon, since it is now published [Sallee, et al. (7)] and is available to everyone. This method is admittedly complicated, requires specialized equipment and is therefore not suitable for routine work. The committee recognizes this and is bravely endeavoring to develop a much simpler but still accurate procedure. This is not easy and it can not be said at this time that the goal is in sight.

Associated with and sparked by the work of the ABS analytical committee, Fairing and Short (8) have developed an alternative method that has been demonstrated to be applicable to analysis of sewage as well as water. Though somewhat simpler than the Sallee, et al., procedure it can hardly be said that this alternative method is truly simple. Search for a method at least as easy as the currently employed "methylene blue" test or the more recent methyl green method of Moore and Kolbeson (9), which are subject to interfer-

ence caused by other impurities in natural waters and sewage, is still sorely needed.

In the realm of analytical methods for phosphates, the Phosphate Technical Advisory Sub-Committee, with H. V. Moss of Monsanto Chemical Company as Chairman, which was originally formed in the early summer of 1955 to cope with all public problems purported to be associated with inorganic polyphosphates in formulated detergents, undertook, as its first assignment, development of test methods for detecting minute amounts and varieties of phosphates in surface waters and sewage.

At this point, a practical method, capable of detecting and differentiating between simple and condensed phosphates at fractional parts per million in distilled water, has been proved out and employed with fair measure of accuracy on surface waters and sewage effluents.

Additional refinements or modifications are now being worked on, to improve accuracy of the method when applied to surface waters and sewage. It is expected that, through the continuing excellent cooperative efforts of the members of this group, a simple workable procedure will be made generally available through publication.

Aside from comprehensive surveys that are being made in the project at the University of Illinois on the levels of phosphate presently existing in surface waters, an interesting set of figures, developed through collaborative analyses by members of the Phosphate Group, shows, in samples of widely distributed normal surface waters, total phosphate concentrations ranging from 0.02 to 0.66 ppm, with apparent condensed phosphate ranging from 0.00 to 0.49 ppm. Among the samples taken was one from the primary effluent of the Chicago Sewage Plant, which was found to contain 12.1 ppm total phosphate, of which 10 ppm was present as fully degraded orthophosphate.

In the work of the Phosphate Group to date no effort has been made to differentiate between different forms of polyphosphate that may exist in surface waters; indeed, because of low levels that appear to be present, it may not be necessary to do so but, should the need arise, it is felt that Karl-Kroupa's (10) recently published paper chromatographic method for differential analysis of phosphate mixtures can be adapted.

Summary

From a bird's-eye view of the situation related to detergents in sewage and water treatment, it appears from the current investigations that have been described briefly that alkylbenzene sulfonate in concentrations now present in sewage does not affect bacterial life nor otherwise significantly affect efficiency of operation of a sewage plant; the problem in this area resolves itself primarily to one of frothing, and methods are being developed to cope with it.

It is nonetheless apparent that ABS in raw sewage is not completely eliminated by existing conventional sewage treatment, and some proportion goes off in its original or partially degraded form through the effluent. There are indications that by control of operations in a sewage plant greater removal of ABS can be achieved in the course of sewage treatment.

At this stage, there is little promise that specialized strains of bacteria capable of completely degrading ABS can be made to subsist in sufficient concentrations in a sewage plant to be effective.

In relation to phosphates, on which attention has been focused with a view to their possible interference in water-treating operations, accumulating evidence points to the fact that the possible offenders (polyphosphates) do not find their way in sufficient concentrations into raw waters to pose a real problem.

It is thus apparent that questions associated primarily with ABS have not yet been adequately answered, nor was it expected that in 18 months of research would a solution to such a complex problem, fraught with so many variables, be in hand at this time.

With this realization, your Research Committee has concluded that in the interest of the public and the industry, research investigations under sponsorship of the AAS&GP should be continued, and recommendations are currently being made to the Board of Directors of this Association toward that end.

The original appropriation of close to $130,000, provided by contributions from interested member and non-member companies, will have been spent by support of the four 2-year university contracts that expire in June, 1957, and in the recommendations by your Research Committee to the Board an additional sum of $118,000 is requested, to be expended over the next two years on five research

projects; future efforts will be directed primarily to seeking remedial measures. Of the new projects that are proposed, perhaps the most important is one designed to find practical and economical means of removing small traces of ABS that occasionally are found in water supplies.

In conclusion, your technical committees wish to express their appreciation for the interest and support demonstrated by the management of the Association and by those who have so willingly assisted in the financial support of the research investigations.

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WATER-SYSTEM IMPROVEMENTS AT TAUNTON, MASSACHUSETTS

BY THOMAS B. WILLIAMS, JR.*

[*Read February 21, 1957.*]

The city of Taunton, Mass., has undertaken a substantial renovation of its water supply and distribution system within the past few years.

At the time the author became associated with the city's water department in 1953 as Assistant to Arthur King, a former President of this Association, engineering studies had already been initiated. Taunton then had but one supply main through which all water from the primary supply source was pumped; no distribution storage facilities; pumping equipment ranging from 38 to over 60 years old, that was operated 24 hours a day, seven days a week; and a maximum demand rate including fire flows of nearly 6 mgd in excess of the system's supply capability. While all of these conditions have not as yet been corrected, the most critical problems have now been overcome, and a system has been designed that, with the early addition of a second supply main, will meet the demands of the Taunton community through 1980.

So far, the recent $1,600,000 rehabilitation of the supply and distribution system has included: (1) construction of a 22.5 mil gal storage reservoir, with connecting mains to the existing system; (2) installation of new pumping equipment and controls at the existing pumping station within the city limits; (3) installation of additional pumping facilities at the supply source; (4) installation of an elevated storage tank and appurtenances at Westville, a nearby suburb; (5) installation of new screens at the intake to the supply main at Elders Pond; (6) and installation of additional distribution mains in the downtown area, as well as subsidiary improvements throughout the system.

When work was first started, the community, which has a popu-

*Superintendent, Water Department, Taunton, Mass.

lation of about 40,000 people, depended for its water supply on three surface ponds, having a combined watershed area of about 34.4 sq mi, a water surface of 7 sq mi, and a storage capacity of 14,630 mil gal. Under the provisions of the ruling enacted by the State Legislature in 1924, the yield of these three ponds is apportioned between the cities of Taunton, New Bedford and Fall River, with Taunton being allocated an average rate of 8 mgd—sufficient, as will be shown later, for community needs for at least 30 years to come. Obviously, the problem was not adequacy of the water source.

Water from the nearest of these three interconnected ponds, Assawompsett, was pumped from a nearby station through about 1.2 miles of 30-inch and 24-inch pipe into Elder's Pond, which was —and is—the supply storage reservoir for Taunton. From here it flowed by gravity through about 6.8 miles of 30-inch main to Harris Street Pumping Station in Taunton.

Elder's Pond is located at Elev. 90, about 40 ft above Assawompsett. It has a water-surface area of approximately 115 acres, and a storage capacity between normal water level and the bottom of the 30-inch gravity supply main of 252 mil gal. This is more than ample for any foreseeable demand condition. Furthermore, the water is acceptable according to public health standards. So neither quantity nor quality was a problem.

It was the 6.8-mile supply main from Elder's Pond to the pumping station that, along with lack of distribution storage, was the core of the situation. The fact that all water flowed through just this one main put the city in a vulnerable position in event of a break. It so happened that in March of 1949 a serious break did occur, with the result that the city had a very limited water supply for a period of nearly 39 hours. Had a fire started at that time, the results could have been disastrous. Two more breaks occurred in 1953. Obviously, corrective measures of some type had to be taken.

At the discharge end of the supply main from Elder's Pond was the Harris Street Pumping Station. This station was built in 1880 and contained, in addition to three steam-driven reciprocating pumps, boilers that delivered steam to the headers at 120 psi. The method of pump operation was to keep at 10-mgd capacity unit in operation at a speed necessary to meet the demands in consumption and, at the

same time, to maintain about 80 psi normal pressure at the pump discharge; to hold a second pump having a capacity of 8 mgd on standby; and to use a third unit to deliver water from an infiltration basin adjacent to the pump house, whenever demand exceeded the 6.8-mil gal delivery rate of the supply main from Elder's Pond. This latter unit had a capacity of about 2 mgd.

All pumps were reciprocating steam-driven units, the first one being 38 years old, the second one over 50 years old, and the third one over 60 years old. Not only were these pumps being operated beyond their reasonable life expectancy, but the auxiliary steam equipment and the steam boiler plant were obsolescent.

The infiltration basin, which at one time was the principal water source for Taunton, has a storage capacity of only 1 mil gal. According to reports, rates of pumping from the basin in the past went as high as 2 to 3 mgd for part of a day only, but records indicated that the maximum for a 24-hr period was closer to 1 mil gal. To determine the safe yield from this source, tests were instituted; these revealed that the maximum volume obtainable during several days' continuous pumping would not exceed 2.5 mgd. Moreover, unlimited usage by the city does not have the unconditional approval of the Massachusetts Department of Public Health, because of the possibility of contamination from Taunton River.

So the maximum yield from the filter basin was 2.5 mgd. The maximum supply from Elder's Pond—due to the limitations of the supply main—was 6.8 mgd. And the total daily volume of water available was 9.3 mil gal. It is interesting to note how this balanced with demand.

Taunton's Present and Future Requirements

As is well known, the fact that the average daily demand or the average weekly demand balances with supply tells only part of a community's water story. It's how supply balances with maximum hourly, daily and weekly demand that gives a truer picture for design purposes.

The condition at Taunton was as follows:

The average daily water-supply requirements for the city totaled about 4.5 mgd during the past 5 years, including the supply

that Taunton furnishes to Dighton and Raynham, and have exceeded 5 mgd during the last two years.

To provide for future expansion, it is predicted that the average consumption may increase to 6.8 mgd within the next 25 years.

However, the fluctuations at hourly rates of water consumption are as much as 160% of the daily rate and, at the present time, exceed a rate of 9 mgd. This, of course, does not include fire-flow requirements, which correspond to a rate of 8.64 mgd.

The figures indicate the necessity, during past years, for pumping from the infiltration gallery during periods of high consumption and the lack of capacity to meet any expansion of the water system and major fire flows. These figures also make it obvious that high-level storage could minimize the problem of high short-time demand.

As a matter of fact, the lack of any water-storage facilities made Taunton's water system unique among those for cities of similar size. It is true that there was a supply reservoir some seven miles from the pumping station, but the pumps had to be operated to distribute the water throughout the system. When demand was low, the main pumps were slowed down; when demand was high, they were speeded up; and when requirements were abnormally high, a stand-by pump, that took water from the filter basin adjacent to the pumping station, was put on the line.

Such operation is an inefficient way to take care of fluctuations, although some systems are designed to be operated in this manner. But Taunton's was not. Storage was obviously needed. The Taunton Board of Water Commissioners had, for many years, considered construction of a distributing reservoir. A site on Prospect Hill, overlooking the city, was acquired about 25 years ago, along with pipeline easements. There were several advantages to a reservoir on that site, in addition to the salient one of providing sufficient water to meet short-time demand: it would afford maximum reliability of service; permit pumps to be operated at a uniform rate, matching the average daily demand; improve the pressure available for fire protection, and permit opportunity to make repairs to other parts of the supply system, including the pumping station and the supply main from Elder's Pond, if necessary. Accordingly, a reservoir was recommend-

ed. The capacity was based on National Board of Fire Underwriters' requirements of sufficient storage to provide a 10-hour fire flow of 6,000 gpm during five days of maximum consumption, with two of the three pumps at Harris Street out of service and with only the emergency supply from the infiltration gallery available. The figures indicated a size of about 22.6 mil gal, and a capacity of 22.5 mil gal was adopted for design purposes.

This reservoir capacity is sufficient to meet present-day requirements. The reservoir capacity will also be adequate to meet future consumption and fire-flow requirements when a more adequate, dependable supply is provided. According to the best estimates, an additional supply of about 5.25 mgd will be required within 25 years.

The engineers investigated various sources for an auxiliary water supply. These investigations indicated that the most satisfactory solution to the requirement for additional water was the installation of a second supply main from Elder's Pond. This accordingly was recommended.

The engineers made other recommendations to improve the efficiency of the system. A 300,000-gal storage tank and booster pump were recommended for Westville, as mentioned previously, and improvements in the distribution system were found advisable. Subsequently, the city decided to improve the pumping and pipeline facilities between Assawompsett and Elder's Pond, and to install new mechanical intake screens at Elder's Pond.

HOW THE TAUNTON PUMPING STATION WAS MODERNIZED

BY FRANK J. TURNBULL*

[*Read February 21, 1957.*]

The primary objective in rehabilitation of the Harris Street Pumping Station at Taunton, Mass., was to secure operating reliability that obviously was not present with equipment ranging from 38 to 60 years old. However, there were some secondary benefits to be derived; namely, a reduction in operating costs and provision for the addition of increased pumping capacity.

The building itself was in need of repair and modernization, having been built in 1880, but it was structurally sound, despite its age. Some renovations were required, such as new heating and lighting systems, removal of the roof monitor, and replacement of the old wood sash; but the cost of these improvements was considerably less than the cost of a new building.

Our studies at Taunton determined that for dependability and economy of operation the existing steam plant should be replaced, and that electric motor-driven, horizontal centrifugal pumps would be the most suitable for primary pumping duty. In this particular instance, the decision was somewhat influenced by the fact that the city of Taunton owns and operates a modern electric power generating plant and distribution system. However, since the power-distribution system in the vicinity of the pumping station would be overhead and, therefore, subject to possible interruption, a diesel engine-driven pumping unit was included for standby service.

The use of the old building simplified the piping arrangement for the new equipment. Each of the old steam-engine pumps had separate 20-inch or 24-inch suction connections, that entered the building along the south and east walls. By connecting two of these together with a 24-inch header inside the building, suction connections could be made to the new pumps with a minimum of fittings.

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Similarly, the old pumps discharged separately to cross-connected underground mains, one of which ran westerly to the center of the city, and the other southerly to feed east and south Taunton. These connections were tied together by a new header along the west wall, into which the new pumps discharged.

The steam pumps were operated at variable speed, to meet the hourly consumption and at the same time maintain a pressure of about 80 lb at the pump discharge. This meant a variation in the pumping rate from about 9 mgd during peak hours to about 2 mgd during night periods. The 80-lb discharge pressure was considered adequate to give reasonable distribution throughout the system.

The supply main to the station from Elder's Pond has a static head of about 70 ft. When the flow in this line reaches a rate of about 7 mgd, the supply-line pressure at the station is 0. This rate of flow was considered as the supply-line capacity, to avoid a negative pressure in this main and prevent air inleakage. In order to meet consumption demands exceeding 7 mgd, a second steam pump was started, taking water from the old infiltration gallery. To pull water from this source required a suction lift of about 15 ft.

With construction of the distribution reservoir, the pumping station would no longer have to supply water at peak demand rates. The pumps could operate at the average daily or weekly rate of consumption. The reservoir would supply the quantity that exceeded the pumping rate and could be replenished at night or during weekends, when the consumption was less than the pumping rate. Pressure and consumption records, flow recordings, and hydrant flow tests were used to establish the operating limits for the hydraulic grade line for both the supply and discharge systems at Harris Street Pumping Station. Calculations established that with a pumping rate of 7 mgd and consumption at a minimum, the maximum pressure at the pump discharge would not exceed 95 lb.

When the pumping rate exceeds the consumption rate, the hydraulic grade line has a continuous slope from Harris Street Pumping Station to the water level in the reservoir, and when consumption exceeds the pumping rate, the hydraulic grade line slopes from both the pumping station and the reservoir toward the center of the city. Operation of the new pumps and reservoir has confirmed the hydrau-

lic computations that the elevation of the discharge hydraulic grade line varies by about 25 ft because of the various consumption requirements. In addition to this variation, the friction loss in the supply line increases the variation in the total dynamic head to about 50 ft.

Two electric-driven pumps were selected with a total capacity, when operating in parallel, of 7 mgd at a total dynamic head of 200 ft. Each pump operates at 1,750 rpm and is driven by a 200-hp motor. Operating singly, each pump delivers about 5.25 mgd at a total dynamic head of 152 ft. The pump efficiency at each of these operating points is about 83%. The standby diesel engine-driven pump has a capacity of 6 mgd and is driven by a 300-hp engine, operating at 1,200 rpm.

With a supply main 7 miles long between Elder's Pond and the pumping station, and the distribution reservoir about 4 miles from the pumping station, water hammer required careful study. Each pump has a hydraulically operated conical plug or "roto" valve in the discharge. The pumps are started manually with the valve closed. When the motors come up to speed, a pressure switch, between the pump and the valve, opens the cone valve at a controlled rate. When shutting down a unit, pressing the normal stop button starts the valve closing. When the valve is closed to about 90% of its travel, a limit switch trips out the motor. The timing of the valve-opening cycle is adjusted independently of the timing of the closing cycle. A similar arrangement is provided for the diesel engine-driven pump. In addition, parallel relief valves are installed on both the suction and discharge headers. In actual operation, this system has been adequate. There has always been sufficient consumption to absorb surges in the discharge system. The relief valves in the supply main have functioned to limit the surge in this main to about 10 lb above the maximum static head.

An oil-accumulator unit provides fluid for the hydraulic operation of the "roto" valves. This system operates at 125 lb. As the water supply is not filtered, an oil system was considered to be more dependable for the operation of the metering devices controlling the rate of valve travel.

An automatic priming system, consisting of a priming valve on each pump, two motor-operated vacuum valves, and a vacuum tank,

is provided for the emergency use of the infiltration gallery. The vacuum system is not necessary during normal operation, but it is useful for purging air accumulated in the pumps when starting. A 25-kw diesel engine generator is installed in the station for emergency lighting and operation of the oil accumulator, priming and heating systems and miscellaneous motors that are required for the diesel engine-driven pump. A transfer panel automatically starts this unit upon failure of purchased power.

The new power service, switchboard, floor space and piping provide for an additional motor-driven pump. If the capacity of the supply system is increased by a new main from Elder's Pond, the capacity of the pumping station can be increased by the installation of an additional pump. This increase in capacity will require reduction of the discharge-system friction by cleaning and cement-lining the mains between Harris Street and the distribution system.

The reconstruction work at the pumping station was started about the same time as the construction of the distribution reservoir. It was, therefore, absolutely essential that pumping-station operation be maintained at full capacity.

The first phase was the permanent construction of the electric power substation in the yard and the installation of the switchboard in the station. One of the new motor-driven pumps was installed on a temporary foundation in an enclosure outside the south wall of the building. Temporary connections were installed between the new pump and the underground supply and discharge mains. Temporary power leads were run to the pump motor from the new switchboard.

After this pump was placed in operation, the steam-engine pump, located at the southerly end of the building, which had been operated during recent years only for standby service, was dismantled. In this space, the new diesel-driven pump unit was installed on its new permanent foundation and placed in full operation. The emergency engine generator was also installed during these initial phases of construction.

After the distribution reservoir was placed in operation, the second steam pump was dismantled. In this space the second motor-driven pump was installed, and the motor-driven pump that had been

operating outside the building was transferred to its permanent location.

The final phase was the removal of the third steam pump and the 150-lb boilers. The new motor-driven and engine-driven equipment, including auxiliaries, occupies about half of the area required by the old steam plant. There are over 2,500 sq ft of floor area available for other water-department use.

The reconstruction work at Harris Street Pumping Station was done under two contracts. The initial contract was with Fairbanks, Morse & Co. for furnishing the Fairbanks Morse pumps, motors, and diesel engine, Stockwell transformers, Monitor switchboard, S. Morgan Smith roto valves and oil accumulator, and Ross relief valves. This contract included provision for supervision by the manufacturer for the proper alignment and operation of the new equipment and conducting field performance tests.

The second contract was with John J. Boyle for the installation of the pumping equipment, building renovations, and electric and heating systems. The piping of the pumps and diesel engine, which was a large part of the second contract, was done by Power Piping Corp. as a subcontractor.

A question frequently asked by visitors is in regard to the disposal of the old pumps and boilers. In accordance with the contract, all of this equipment, including the piping, became the property of the contractor in place. The contractor was paid $100 by the city to remove it from the site. The total weight of metal removed was about 400 tons. The weight of the new equipment and piping is about 40 tons.

The modernization of a pumping station of this size has many problems that come up during the course of construction. There are limitations of working space and material-handling equipment. It is necessary to complete the installation of each unit, and unavoidable delays are caused because one trade cannot work until another trade gets out of the way. On the other hand, there are advantages. As soon as the temporary installation of the first pump was made, the full dependence on the old steam plant was relieved. The gradual transition from steam operation to electric power eliminated the

natural reluctance of stationary steam engineers to accept electric operation.

The results of the final field performance tests and the over-all operation of the new equipment have been very gratifying. For example, the final tests were made on No. 1 pump in its permanent location after it had been operating for a year in its temporary location, and the performance was found to be well within the original guarantee. During the winter months, one motor pump, operating at constant speed and delivering about 5.25 mgd, has carried the load. The recording pressure charts show a smooth line, indicating a sensitive balance with the flow in and out of the reservoir. The pumping rate has been slightly greater than the average consumption, and the pumping station has been shut down periodically when the reservoir was full. During these shut-down periods, the reservoir has served the entire distribution system.

THE NEW DISTRIBUTION RESERVOIR AT TAUNTON

BY FOZI M. CAHALY*

[*Read February 21, 1957.*]

Before discussing details regarding the new distribution reservoir at Taunton, let us review quickly the principal points of background affecting the design. This was to be a 22.5 mil gal storage facility that would be located on the output side of the Harris Street Pumping Station. Water would be automatically pumped to the reservoir from the system or would flow from the reservoir to the system, depending upon whether demand was high or low. The use of multiple units at the pumping station, as well as provision for some adjustment in flow rate by using one or more pumps, would provide the necessary flexibility.

Prospect Hill, located about two miles north of the business section, was selected as the site of the reservoir. This site consisted of wooded areas which had been purchased by the city many years ago for water-storage facilities.

Topographical features at the site made it mandatory that part of the open reservoir be placed in cut and part in new fill or embankment. The orientation of the structure was chosen so that the necessary amount of fill material was obtained exclusively from the cut areas. Specifications covering the embankments called for the maximum possible compaction, in order to provide a stable foundation for the concrete reservoir lining. Exploratory borings, about 15 in number, had been made for design purposes and had revealed one to three feet of loam or loamy sand at the surface, below which *sand* was indicated almost exclusively. No ground water was encountered even as low as 80-100 ft. The compaction of the fill portions was accomplished by spreading and bulldozing the fill material in layers 12 in. thick and rolling with several passes of rubber-tired or wobble-wheeled rollers. Compaction was established readily at 92-97% of maximum optimum density and averaged about 95%.

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The reservoir itself is a rectangular, concrete-lined structure, approximately 170 ft by 500 ft at the bottom and 274 ft by 604 ft at the top. The depth is 27 ft. It is divided transversely into two sections by a reinforced-concrete wall, to permit draining each section separately for cleaning and maintenance. The lining consists of a 6-inch reinforced-concrete slab, and the sides are built on a slope of two horizontal to one vertical.

One of the main features in the design is the use of rubber water-stops, embedded midway in the concrete slabs at the expansion joints. In section, these water-stops are shaped like a dumbbell and are 6 inches wide. One-half of the rubber seal was positioned in the slab by holding the rubber firmly in especially made forms. After the concrete was poured and set, the forms were removed. Premolded cork strips, ¾-inch thick, were then placed under the rubber stop, and wooden strips were placed above it, before the adjacent slab of concrete was poured. After the last slab was poured, the wooden strips were removed, to leave a ¾-inch empty half-joint between the adjacent concrete slabs.

The original joint design specified that a rubber filler be placed in this empty half-joint above the water-stop, to prevent the accumulation of silt. However, installation of this filler, as well as the water-stop, requires extreme care. When tests were first conducted, leakage in excess of the allowable 75,000 gal per 24 hr resulted. Consequently, the rubber joint filler was removed, and an asphalt-base rubber compound was poured in its place. This change reduced the leakage considerably, but not to the required limits. At this writing, the contractor is still working on the problem, the scope of which is intensified by the fact that there are some 12,500 lineal feet of rubber joints. It is expected that forthcoming tests will prove construction to be acceptable.

The concrete wall dividing the reservoir into equal sections is of the gravity type, 16 in. wide at the top and sloping out to 4 ft 4 in. at the bottom. It is supported on a spread footing 24 ft wide, with the usual keyway in the middle for anchorage. Underdrains are provided along the edge of the footing on both sides, in order to relieve uplift pressure; these underdrains discharge into the blow-off

basin, which is primarily for use in completely draining the reservoir.

Other features of the design include:

Spread footings 10.5 ft square, which act as part of the floor and are intended to be used to support a future cover over the entire reservoir. Reinforcing steel, protected temporarily by low-grade concrete, was installed in the middle of each footing for the future columns that will be built to support this roof.

All expansion joints were supported on continuous concrete sills, measuring 16 in. by 8 in. in section. The top of these sills was covered with tar paper, to prevent bond between the sills and the concrete floor slab and thus permit expansion and contraction of the slab.

A special rodent barrier on the top of the parapet wall around the reservoir. Built of corrugated asbestos-cement sheets about two feet high and curved outward at the top, it is attached to pipe posts sunk in the wall.

Provisions for mechanical screens and chlorinators in the gatehouse structure. At the present time, wooden screens are being used and no sterilization is necessary, but these conditions may change in the future.

A telemetering system, indicating reservoir water depth, has been installed and registers in the Superintendent's office downtown as well as at the Harris Street Pumping Station. Normal depth of water is 25 ft, which allows a freeboard height of two feet.

Two water-supply mains of Lock Joint, prestressed, reinforced-concrete cylinder pipe were constructed in conjunction with this project, one a 24-inch water main approximately 10,650 ft long, and one a 20-inch supply main approximately 7,000 ft long. These two lines are connected to the distribution system in the city and extend to the reservoir by two routes. The route of the 20-inch main presented no problem. The 24-inch line crosses a swamp at the bottom of Prospect Hill, where it is supported by piles 30 to 50 ft long, capped by pile caps and rangers of creosoted timber.

Before entering the reservoir, these two water-supply mains pass through a control gatehouse. Piping in this gatehouse is designed in

such a way that it will be possible to divert water from either half of the reservoir into either supply line or to deliver water from either side of the reservoir into both supply lines. Water is delivered into each half of the reservoir by means of one 20-inch pipeline, which extends along the floor of the reservoir to the corner opposite the gatehouse. This scheme is used for both sections. Water leaves the reservoir by means of another 20-inch line, which connects to the wet well of the gatehouse and thence to the supply main.

Thus, Taunton has secured not only the water-storage capacity necessary during periods of maximum demand, but also an operating flexibility that previously did not exist in the system. The reservoir and supply mains were constructed by R. Zoppo Co., Inc.

Time does not permit detailing all of the other improvements, but a brief mention of these might be desirable, in order to record those that have been made or are planned for the future.

The force main from the Lakeville Pumping Station to Elder's Pond was cleaned and cement-lined. This work was done by Centriline Corp. As a result, the capacity of the existing motor-driven pump has increased from 6.5 mgd to about 8 mgd. A new diesel pump that now is being installed will have a variable-speed capacity of 8 to 10 mgd.

Elder's Pond has a storage reserve of 25 to 30 days of maximum consumption. The outlet of this pond was improved under this program by the installation of a Link Belt mechanical screen. The screen was installed and a new screenhouse superstructure was constructed by R. J. Berke & Co.

A 300,000-gal tank at Westville with an overflow at Elev. 250 was constructed by Chicago Bridge & Iron Co. The foundations, booster pumping station and pertinent water mains were constructed by R. H. White Construction Co.

However, construction of the second main from Elder's Pond to Harris Street was not done. Regarding this part of the program, the following is quoted from the latest annual report of the Board of Water Commissioners: "It should be noted that an additional supply line was recommended in conjunction with the Prospect Hill Reservoir and Modernization Program now under construction. Because funds were not made available, it was eliminated. However, this second line from Lakeville is at present needed for dependability

of supply and will in the near future be absolutely necessary for adequacy of supply. The Board, therefore, recommends that funds be made available for this work."

The program of improvements was initiated and carried out under the direction of the Board of Water Commissioners, Francis J. Bassett, Ralph M. Tucker and Frederick L. Tripp.

OXYGEN DEMAND EXERTED BY LEAVES STORED UNDER WATER

BY E. SHERMAN CHASE* AND ALFRED F. FERULLO†

[*Read at Chemists' Round Table, March 21, 1957.*]

Natural pollution may be defined as the material, organic and inorganic, washed or blown into streams and lakes from woods and fields, cultivated lands and country roads. Particularly significant in water-supply reservoirs are the autumn leaves blown or washed therein. These leaves, when waterlogged, sink to the bottom and in the process of slow decay exert a long-continued demand on the dissolved oxygen of the overlying water.

So far as the authors know, no attempt had been made to determine quantitatively the oxygen demand exerted by leaves over an extended period until a few years ago, when a limited study was carried out in our laboratory by the late Stuart Coburn. This study was made to obtain an estimate of the amount of oxygen used up by the decomposition of leaves when stored under water for many days in excess of the conventional 5-day B.O.D. period of incubation.

A repetition of this earlier investigation was undertaken about two years ago on a somewhat more elaborate scale. In this second study autumn leaves and pine needles were used. The method of conducting the study is described in the following paragraphs:

One gram of dead maple leaves and four grams each of dead oak leaves and fallen pine needles (all air-dried weight**) were submerged each in 5 gal of Boston tap water in carboys. Sixteen ounces of water from a water-supply pond in Marlborough were used as seed in each carboy. The necks of the carboys were fitted with rubber stoppers, through which glass tubes 6 in. long were inserted, to permit expansion and contraction with changes in temperature. With the carboys completely filled with water the opportunity for absorption of oxygen from the air was practically nil. When neces-

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**Approximately 10% moisture.

sary, distilled water was added to the carboys through the glass tubes to compensate for small losses due to evaporation.

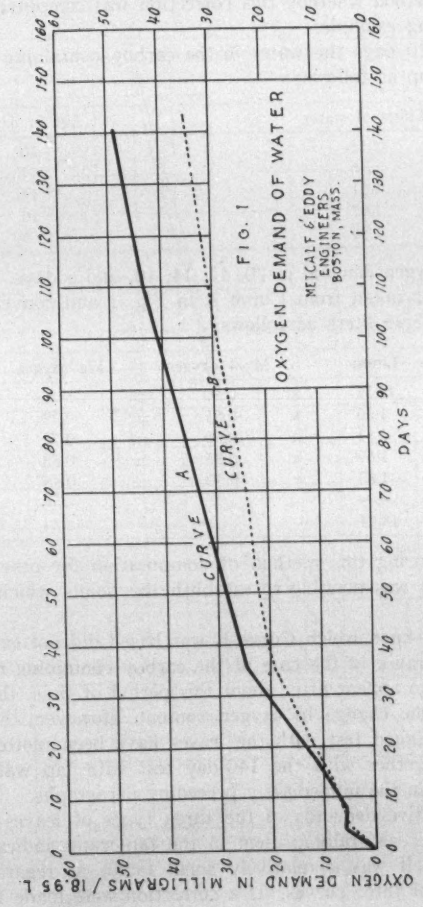
During the test the carboys were kept on a laboratory bench several feet away from the windows. Facilities were not available to permit keeping them at a uniform temperature, and hence the incubation temperature varied somewhat with the room temperature, which ranged between 20° and 29° C. The average temperature approximated 25° C. At intervals samples of water were removed from the carboys for determination of dissolved oxygen. This sampling schedule was maintained for 386 days, at the end of which period the test was discontinued.

Each carboy contained 18.95 liters of water. Whenever an oxygen determination was made, a quart of water was removed for the test. This necessitated replacing the amount removed with an equivalent amount of fresh tap water. After this procedure the water in the carboy was aerated with compressed air. A second quart of water was then removed from the carboy for determination of the dissolved oxygen in the freshly aerated water. This removal and replacement resulted in the net addition of 1.95 quarts of fresh water each time dissolved-oxygen determinations were made, or 9.75% of the total content.

Obviously, some error resulted from the repeated additions of nearly 10% of fresh water with a certain amount of oxygen demand and from the demand of the original water. To arrive at an estimate of the magnitude of this error and a correction factor, several bottles of tap water were incubated for various periods of time at room temperature, and the residual dissolved oxygen was determined at the end of successive periods of elapsed time. The results of this test are shown by Curve A in Fig. 1.

It will be seen from this figure that the organic matter naturally present in Boston tap water continued to exert demand for oxygen for at least 140 days.

The results shown on Curve A could not be applied directly as a corrective factor to the results obtained in the carboys containing the leaves. This was due to the varying lengths of time in which the added increments of tap water were incubated in the leaf-containing carboys. Consequently a corrected curve (Curve B) was computed to take this fact into consideration.


OXYGEN DEMAND OF WATER
FIG. 1
METCALF & EDDY
ENGINEERS
BOSTON, MASS.
CURVE A
CURVE B
DAYS
OXYGEN DEMAND IN MILLIGRAMS / 18.95 L

The method whereby this correction was computed is shown by the following example:

After 20 days the water in the carboy containing maple leaves was made up as follows:

Liters of water	Age in days
12.55	20
1.36	17
1.51	14
1.67	10
1.85	6

The oxygen demand in 20, 17, 14, 10, and 6 days, in milligrams per liter, was taken from Curve A in Fig. 1 and converted to milligrams per 18.95 liters as follows:

Liters		Mg/l oxygen		Mg oxygen
12.55	x	0.70	=	8.79
1.36	x	0.55	=	0.75
1.51	x	0.50	=	0.76
1.67	x	0.35	=	0.58
1.85	x	0.30	=	0.56
18.94				11.44

By following this method of computation for other periods of incubation, it was possible to establish the points which determined Curve B.

The test upon which Curve B was based did not extend beyond 140 days, because in the case of the carboy containing maple leaves algae began to appear after about this period of time, thereby interfering with the change in oxygen content. However, the results of the long-continued test with the leaves have been plotted as shown in Fig. 2, together with the 140-day test with tap water adjusted as described in the immediately preceding paragraphs.

The relative demands of the three types of leaves and of the organic matter naturally present in the tap water indicate that the tap water itself was a relatively small factor as regards its effect upon the other three curves. If a correction were made for the oxygen demand of the tap water, the other curves would be modified but

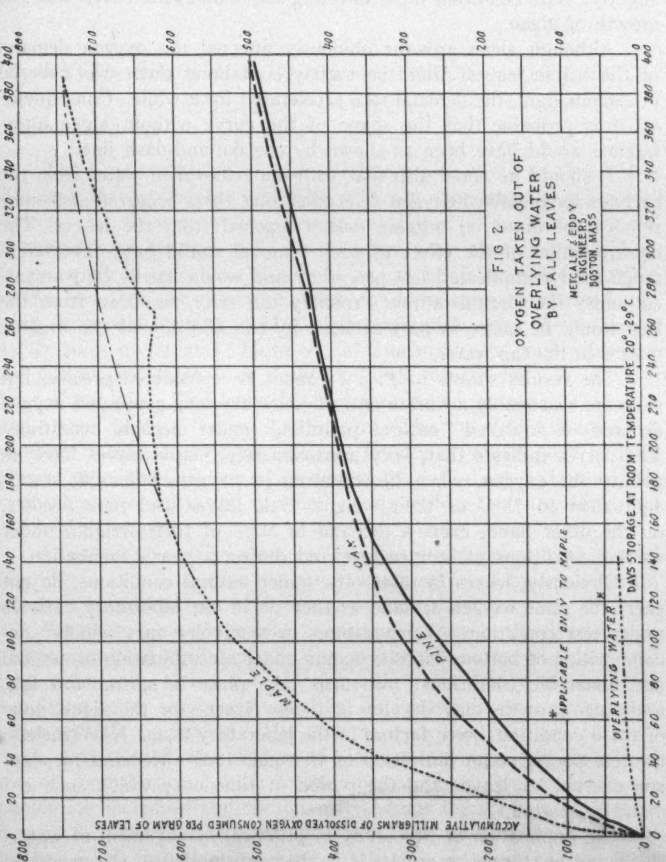


FIG 2
OXYGEN TAKEN OUT OF OVERLYING WATER BY FALL LEAVES
METCALF & EDDY ENGINEERS BOSTON, MASS
ACCUMULATIVE MILLIGRAMS OF DISSOLVED OXYGEN CONSUMED PER GRAM OF LEAVES
DAYS STORAGE AT ROOM TEMPERATURE 20°-29°C
OVERLYING WATER
* APPLICABLE ONLY TO MAPLE
MAPLE
PINE
OAK

slightly. The condition most affecting the maple-leaf curve was the growth of algae.

Although algae growths obviously affected the oxygen demand of the maple leaves, after the carboy containing them was covered to exclude light, the demand rate accelerated for a while. Consequently, it is probable that the shape of the curve without algae interference would have been as shown by the dot-and-dash line.

It should be noted also that with the removal of water from the carboys for dissolved-oxygen determinations, there occurred also some removal of dissolved organic matter leached from the leaves. The determination of the effect of such removal would have involved a much more complicated test procedure and would hardly be warranted under the circumstances. Probably the error resulting from the loss would be offset in part at least by the addition of the organic matter in the tap water.

The results shown in Fig. 2 cannot be considered precise, but they are reasonably accurate and do show the long-continued oxygen demand of so-called "natural pollution" under aerobic conditions. The curves indicate that, very approximately, maple leaves have an avidity for oxygen, when decomposing in oxygen-containing water, equivalent to 75% of their weight. Oak leaves and pine needles, on the other hand, exert a demand of 50% of their weights under similar conditions of temperature and during a year's incubation.

Obviously, leaves in reservoirs, under natural conditions, do not exert the same oxygen demand as they do in our laboratory carboys under test conditions. Temperatures in reservoirs vary widely; decomposition of bottom deposits occurs under a combination of aerobic and anaerobic conditions; overturns take place in spring and fall, and algae growths may develop at times. Except for the algae, none of these conditions were factors in the laboratory tests. Nevertheless, the test does give an indication of the quantitative demand for oxygen exerted by leaves and the period of time over which such demand is exerted.

The application of this study to practical management of watersheds and of storage reservoirs is in the confirmation of the generally accepted use of conifers for watershed plantings and of the value of periodic flushing of bottom waters from behind dams.

A WATER RESOURCE PROGRAM FOR MASSACHUSETTS

BY CLARENCE I. STERLING, JR.*

[*Read March 21, 1957.*]

The Commonwealth of Massachusetts, as well as its sister New England States, has been blessed with an abundance of water resources. We have an average annual rainfall of 43 in. in comparison to the national average of 23 in. In a wet year it may be as high as 60 in., while in a dry year it may be as low as 30 in. More fortunate is the fact that the rainfall is fairly uniform throughout the entire year. Approximately 45 to 55% of the rainfall flows to the sea in our 4,230 miles of streams. However, Massachusetts is doubly blessed, for it receives stream flow resulting from rainfall in Vermont and New Hampshire. There are 254 sq mi of water surface in this state and a total land surface of 7,875 sq mi. The water area is made up of about 1,215 Great Ponds (a Great Pond is a natural pond with an area of more than 10 acres), having an area of about 153 sq mi, the remaining area consisting of small ponds of less than ten acres and artificial reservoirs.

Evaporation studies made by Fitzgerald many years ago showed that 39 in. are lost annually from water surfaces by evaporation, which is approximately 90% of our average rainfall.

Water was one of the most important factors in the development of the industrial wealth of the Commonwealth during the past century and a half. It was used for domestic water-supply purposes, for supplying power to operate our mills, for industrial water-supply purposes and for navigation. The streams were used also for carrying away our treated and untreated domestic sewage and industrial wastes, for fishing and other recreational purposes. Naturally, as our population increased and the intensity of our industrial use of water increased, it became necessary to enact legislation to establish controls over this valuable resource.

Basically, the principle of riparian ownership has been followed,

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a heritage from our British forefathers. The owner of land abutting on a stream has the right of reasonable use of the stream and its water not inconsistent with the similar right of other riparian owners. Reasonable use depends on the size of the stream, the damage suffered, the extent and type of development of adjacent areas, climate, soil and other factors. In regard to the great ponds, the rights of use are vested in the public, and the abutter has no greater rights than any other member of the public, except that he may have more easy access. The right to use the pond may be prohibited or regulated by the legislature or a specific agency to which the legislature has delegated its power to control the use of the great ponds.

Through the years a number of agencies have been entrusted with the responsibility of supervising the various aspects of water usage. For example, the State Department of Public Health was authorized in 1886 by Chapter 274 to have oversight and care of inland waters and also to recommend measures to prevent pollution of such waters. The original act was later amended to give the department the right to issue rules and regulations to protect water against pollution, especially those waters used for domestic water-supply purposes. This authority to make rules and regulations was extended to all waters of the Commonwealth by the passage of Chapter 615 of the Acts of 1945, the so-called "Comprehensive Stream Pollution Control Act."

Boards of county commissioners in the various counties have the responsibility for the safety of dams with a height in excess of 10 ft. The Division of Waterways of the State Department of Public Works is authorized to license structures encroaching upon our waterways and also to carry out programs of stream clearance and flood control. When the Department of Commerce was created recently, it was entrusted with certain aspects of flood control. The State Reclamation Board is concerned with the drainage of land, not only for insect control but also for land development. The Department of Natural Resources, when it was re-organized, was entrusted with certain aspects of the recreational development of our water resources. The Metropolitan District Commission, while originally established to supply water and provide sewage-disposal facilities for the Boston Metropolitan Area, now has additional responsibilities in regard to

stream flow, drainage and flood-control projects. The Department of Agriculture has become more interested in the use of water for irrigation as the benefits accruing by using the optimum amount of water during the growing season become more clearly recognized.

In addition, other special commissions have been established to control the pollution of our interstate streams, as well as to provide for flood-control projects in the Connecticut River Valley and, more recently, the Merrimack River Valley.

The Division of Sanitary Engineering of the Massachusetts Department of Public Health has undertaken many of the functions of a water-resources commission in obtaining basic data. That Division established rainfall-measurement stations; it installed stream-gaging stations to measure our stream flows, and it later entered into a cooperative agreement with the U. S. Geological Survey for the maintenance of these stations. The Metropolitan District Commission installed similar gaging stations. Water-resources studies were made by the Massachusetts Department of Public Health as well as by certain special legislative commissions. The Division of Waterways of the Department of Public Works is carrying on geological mapping and ground-water study programs in cooperation with two different branches of the U. S. Geological Survey.

It can readily be seen that the multiplicity of agencies carrying on the same type of functions led to confusion of the general public, their representatives in the legislature, and the various federal agencies working with the Commonwealth on water matters. It also led to competition among the agencies for their share of the tax dollar. There was little coordination between the various departments, and it became apparent that with competing uses developing for our water resources, a coordinating agency was needed to establish basic statewide policies. Furthermore, due to drought conditions in other parts of the United States, flood conditions in New England, the public demand for pollution control, and the increased demand of our residents for recreational resources as the result of more leisure time, attention was focused on the need for the establishment of a coordinating agency, responsible for the solution of problems occurring not only within the Commonwealth and the other New England States, but also in conjunction with the Federal Government.

As a result, former Governor Christian A. Herter, in December, 1954, appointed an Ad Hoc Committee to advise him regarding water-resource problems. The members of the Committee were the Commissioner of the Department of Natural Resources, who was designated as Chairman, the Commissioners of the Departments of Public Health, Public Works, Commerce, and Agriculture, and the Chairman of the Metropolitan District Commission. This group, or their designated representatives, met monthly, and for the first time there was group discussion of water problems. The passage of the so-called Public Law 566 by Congress, to authorize the Secretary of Agriculture to carry out watershed programs cooperatively with legally established agencies within the states, was a factor in hastening the establishment of a Water Resources Commission.

The legislature enacted Chapter 620 of the Acts of 1956, establishing a Division of Water Resources in the Department of Natural Resources under the control of a special nine-man Water Resources Commission, with the Commissioner of Natural Resources designated Chairman. The Commission consisted of the same Commissioners, or their representatives, that formed the original Ad Hoc Committee, plus three public members appointed by the Governor.

The act provides that the Water Resources Commission shall be the agency of the Commonwealth responsible for the coordination of all activities of the Federal, State and other agencies in the conservation, development, utilization and disposal of water for the purpose of preventing loss of life and damage of property by erosion, flood waters and sediment in the watersheds of the Commonwealth. The Commission is instructed to obtain the necessary financial assistance available from the Federal Government under Public Law 566. It is the contracting authority for the construction of any works of improvement constructed under that act, and it designates the appropriate Department or subdivision of a Department as its agent in performing the actual construction work. The act clearly stated that none of the duties given to the Commission were intended to change or modify any of the existing powers in any Department, agency or subdivision of the Commonwealth.

The legislature made available the sum of $40,000 for six months' operation during the remainder of the current fiscal year, and

Governor Furcolo has proposed an appropriation of $100,000 for the operation of the Commission during the next fiscal year.

Recently three reports have been filed with the legislature as a result of special studies made concerning water problems. These are:

(1) The Department of Public Health was directed by Chapter 67 of the Resolves of 1954 to make a report relative to the preservation of the purity of water supplies in relation to other uses of water-supply sources. The report is voluminous and to date has not received a legislative document number.

(2) The Special Commission established to investigate and study ground-water supplies in Plymouth and Bristol counties, as instructed by Chapter 68 of the Resolves of 1955, filed a report which is published as Senate Document No. 540.

(3) The Legislative Research Bureau was instructed to make a study of water rights as affecting surface and subsurface water supplies in Massachusetts. That bureau has now filed its report with the legislature, but it has not been given a document number or published to date.

These special investigations were started prior to the establishment of the Water Resources Commission, and there are recommendations contained in all three reports for the Commission either to implement the recommendations in the reports or make further studies.

There is little question that the use of water for domestic purposes has top priority. In 1870, five years after the close of the Civil War, 18 municipalities in Massachusetts were served by public water-supply systems, which served a population of slightly over 500,000 persons. From that time on there was a rapid increase in the number of municipalities installing public water-supply systems. This was due to the industrial growth of the state and the improved sanitation that was being developed for its residents. Then, with the advancement of the germ theory of disease and demonstrations that many diseases were water-carried, private wells were abandoned and safe sources of water supply were developed. The establishment of the Division of Sanitary Engineering and the Lawrence Experiment Station by the State Board of Health in 1886 gave great impetus to the development of the methods of analysis of water and the methods of treatment.

Today we have over 300 water-supply systems, located in 273 of 351 municipalities in the state, as shown in the following table:

NUMBER OF WATER-SUPPLY AGENCIES IN MASSACHUSETTS CLASSIFIED BY TYPE OF AGENCY AND BY TYPE OF SOURCE*

Type of water-supply agency	Number of agencies	Number supplying water from		
		Surface sources	Ground sources	Surface and ground sources
Municipal Water Department	177	62	85	30
Water District	81	23	48	10
Water Company	48	11	33	4
Totals	306	96	166	44

*1. The entire Metropolitan Water Supply District is counted as a single agency.
2. Where one agency supplies water purchased from another, it is considered as having the same type of source.
3. In determining type of source, regular and auxiliary sources are considered, but not emergency sources.

Today, 98.4% of the population in the state are residing in communities having public water-supply systems. It is estimated at the present time that the safe yield of our public water-supply sources is nearly 800 mgd, while our present water consumption is about 480 mgd. The Metropolitan District Commission supplies nearly 200 mgd, or about 42% of the water being used in this state. It is anticipated that if our water consumption increases at approximately the same rate as in the past 15 years, the amount of water consumed will equal the safe yield of our present sources by the year 2,000. This statement, however, does not mean that we have adequate water supply until that year. In many cases, it is a problem of distribution. Some communities have an adequate available supply for many years in the future, but there is an increasing number of communities where existing sources of water supply are inadequate to meet the ever growing need. It is not only the increase in population that is causing the increased water demand, but the increased per-capita consumption due to our ever improving standard of living. The introduction of air conditioning, as well as automatic laundry and dishwashing machines, and the greater number of persons living in suburban areas, with an increased use of lawn and garden sprinklers, have led to a sharp increase in the per-capita water consumption. Today some of our medium-size cities are in urgent need of securing additional sources of water supply.

Since 1940 not a single great pond has been taken by any municipality for additional water-supply purposes. During that same period 232 new ground-water sources were developed and 9 artificial reservoirs were constructed.

Approximately 10% of the land in the state is included within the drainage areas of sources of public water supply. These lands are subject to the rules and regulations of the Department of Public Health. However, the provisions of these rules and regulations are such that they should not cause any undue hardship to those residing in these watershed areas. These rules are essentially the same as those used in all areas in the Commonwealth, in order to prevent dangerous health or objectionable nuisance conditions.

From time to time the department has found it necessary to approve the purchase or acquisition of land by a municipality for the sanitary protection of the source of supply, where it is impracticable to enforce the rules and regulations. At the present time, 3.1% of the land in the Commonwealth is held for the protection of natural ponds or artificial reservoirs used as sources of municipal water supply. Less than 0.4 of a per cent of this land is located on the drainage areas of natural ponds. During the past ten years the department has held a number of public hearings in regard to taking land for the protection of sources of water supply. During that period nine land takings, with an aggregate area of 275 acres, were approved on the drainage areas of great ponds.

An investigation further showed that of the 1,215 great ponds having an area of ten acres or over, only about 10% were being used as sources of water supply, the balance of approximately 90% being available for recreational and other uses. Of the four principal recreational uses made of water—namely, bathing, fishing, boating and skating—only bathing is specifically prohibited by law in sources of water supply. The Department of Public Health in its rules and regulations delegates authority to the local boards of water commissioners to issue permits for fishing, boating and skating. These boards of water commissioners are legally responsible for providing safe water supplies. They are subject to financial as well as criminal action if they are shown to be negligent in safeguarding the water supplies under their direction. Thus, they are understandably reluctant

to permit recreation on the reservoirs. Some recreational activities are permitted on a number of water-supply sources under specific conditions. A summary of the recreational uses made of our natural ponds used as water-supply sources and on artificial reservoirs that were created primarily for public water-supply purposes is shown in the following table:

SUMMARY OF RECREATIONAL USES OF WATER-SUPPLY SOURCES IN MASSACHUSETTS

No. of sources	Boating and fishing	Shore fishing	Skating	Hunting on land owned	Picnicking on land owned
		Natural (Great) Ponds			
61	13	10	8	11	4
		Artificial Water-Supply Reservoirs			
140	7	11	2	11	5

In general, the department recommends against recreational activities on the smaller ponds and reservoirs which are direct sources of water supply.

If additional recreational uses are to be made of the existing sources of water supply, consideration must be given in each specific case to the amount of treatment that should be provided and the conditions under which the recreation should be permitted. It must be kept in mind that the construction of treatment plants is costly, and their maintenance constitutes a major item in the cost of supplying drinking water.

Indications are that the Department of Public Health's policy of encouraging the smaller municipalities to develop additional sources of water supply from ground-water sources should be continued. The investigation concluded that the larger municipalities will be forced to acquire additional water from surface sources. Whether these sources would be artificial storage reservoirs or natural great ponds depends upon the locality. Some of these natural lakes and ponds are now being used by the public for recreational purposes, including swimming. If it becomes necessary to use such lakes and ponds for

domestic water supply, then it will be essential to consider each case separately with due regard to (1) the times of drawing water therefrom, (2) the amount of dilution in the body of water to which the water is to be discharged for storage before being drawn for consumption, (3) the pollutional load, (4) the type of treatment works necessary to provide a safe water supply, (5) the attitude of the population to be supplied, and (6) the economics of each problem.

It is felt that with the establishment of the Water Resources Commission a policy will be developed in which all uses of water will be considered before sources of water are allocated for special purposes, including domestic water supply.

In 1953 the industrial use of water was estimated to be about 847 mgd, approximately twice the domestic water consumption. By the year 2,000 this industrial consumption probably will be doubled.

The third largest use of water is for agriculture. In Massachusetts in 1940 only 2,049 acres were irrigated, but by 1954 this number had increased to 22,683 acres. The U. S. Department of Agriculture has stated that the optimum amount of water required to raise one acre of corn is 900,000 gal. As the moisture need for agriculture is the heaviest during the periods when rainfall and stream runoff are usually lowest, this presents a problem in some of our watershed areas. The situation is further aggravated by the fact that a great portion of the water used for the irrigation of crops is lost to other uses by evaporation and transpiration, with only a small portion of the water entering the underground water table.

The need for drawing water from storage for supplementing natural flows during the summer months conflicts with the demand to maintain our reservoirs and pond levels at their maximum height during the recreational season.

The program of the Water Resources Commission can be divided into five categories:

(1) To coordinate the activities of the existing state agencies, in order to insure that all interests are protected in programs carried out by the various agencies.

(2) To act as a clearing-house for all basic water-resource data, as well as to be the agency to undertake basic water-resource investigations.

(3) To review existing laws and policies and attempt to formulate a more comprehensive policy, taking into consideration the growing demands made by various segments of our population.

(4) To advise the legislature in the matter of allocation of water sources or usage.

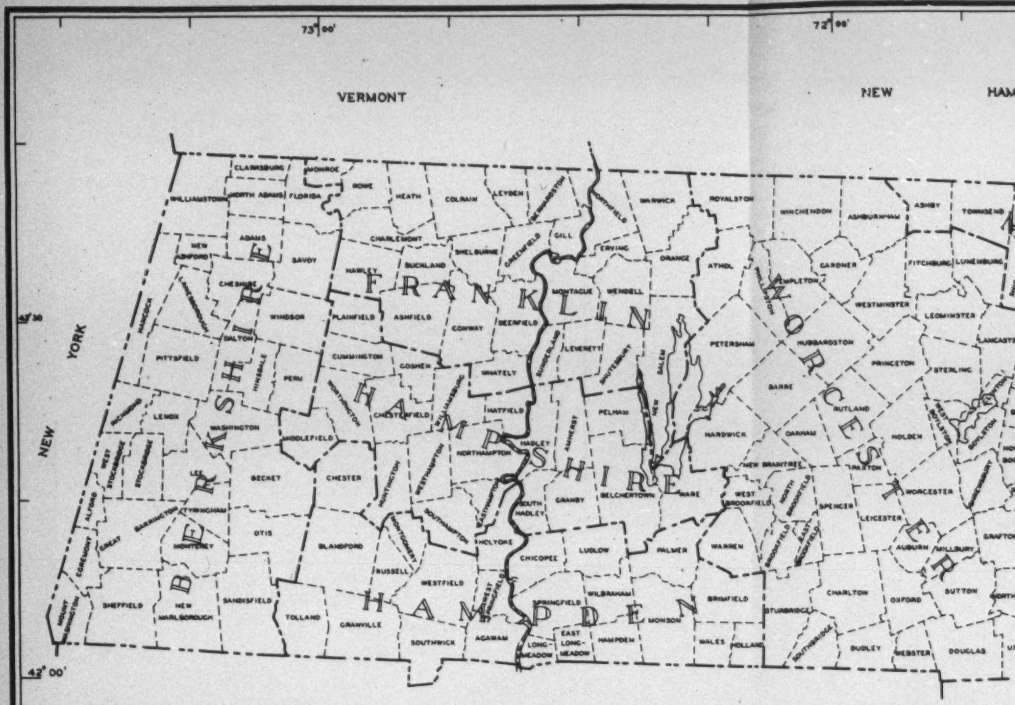
(5) To act as a coordinating agency for the Commonwealth with the various Federal and interstate agencies in matters relating to water-resources development and water usage.

One of the basic resources, the extent of which must be explored, is the availability of ground water. To date only a very limited area has been investigated. The U. S. Geological Survey in cooperation with the Massachusetts Department of Public Works has been doing bedrock and surficial mapping. The Department of Public Works has also been cooperating with the Ground Water Branch of the U. S. Geological Survey in a specific ground-water investigation in the valley of the Ipswich River, while the Ground Water Branch has been doing reconnaissance and general area investigations of the ground-water conditions in the Concord River drainage area in the vicinity of Lowell.

A Special Commission that was investigating ground water in Plymouth and Bristol Counties did a surficial geology survey of approximately 650 sq mi in the so-called Lakeville ponds area and in the town of Dartmouth. It compiled data on 885 major wells and did seismic studies in some 11 areas. The work was not completed before the Special Commission was required to file a report. The Special Commission recommended that the unexpended funds be transferred to the Water Resources Commission for continuation of that investigation.

While there is undoubtedly a wealth of material available on ground water in this state, it has not been compiled by any one agency. Such material is of little value until it is assembled, evaluated, and then presented in a form which can be used readily by waterworks men, industrialists, consulting engineers, agriculturists, and others who are interested in the development of ground water.

The Commission has made a start in ground-water investigations by entering into a cooperative agreement with the Ground Water



THE COMMONWEALTH OF MASSACHUSETTS

STATUS OF GROUND WATER STUDIES

MARCH 1957

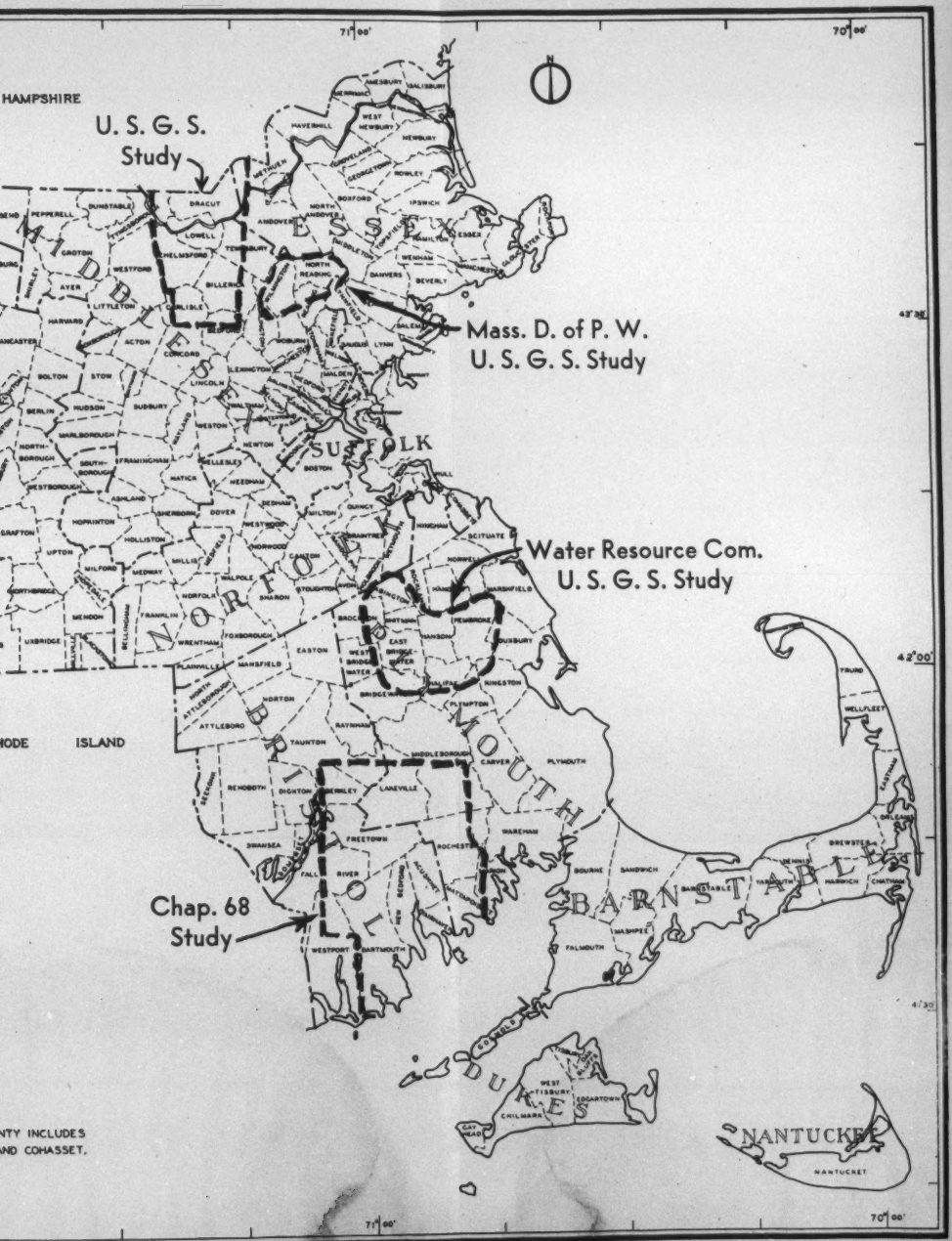
WATER RESOURCE COMMISSION

NOTE: NORFOLK COUNTY I
BROOKLINE AND C

10 0 10 20 30 40

SCALE IN MILES

FIG. 1.



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G. 1.

Branch of the U. S. Geological Survey for a survey of the Monponsett Pond area in Plymouth County. A map showing the areas which have been investigated is presented in Figure 1.

It is interesting to note that nine quadrangles on bedrock geology, each covering an area of approximately 55 sq mi, have been completed and published jointly by the Massachusetts Department of Public Works and the U. S. Geological Survey and are available to the public. Thirteen quadrangles on surficial geology have been completed and published. There are numerous other maps of both bedrock and surficial geology in various stages of preparation at the moment. These, together with the topographical maps, are most helpful in making ground-water studies.

At present, the Commission will work jointly with the Ground Water Branch of the U. S. Geological Survey in so far as reconnaissance and general areal investigations are concerned, with the Commission doing the detailed quantitative and qualitative investigations in certain high-priority areas.

One of the aims of the Commission is to be helpful to the waterworks profession in regard to the development of safe and adequate domestic water-supply sources, keeping in mind, however, other water needs in the development of such sources. The members of the Commission realize their responsibility for developing an integrated water-use program plus the solution of other water problems, such as flood control and flood-plain zoning in relation to the proposed Federal Flood Insurance Program. The present staff is limited to three consultants, who are specialists in the engineering, the legal aspects, and the conservation and recreational aspects of water-resource development. The Commission feels that additional staff should be added gradually as the program needs develop. The success of the program depends to a large extent on the cooperation of the members of the New England Water Works Association and similar groups.

A copy of Chapter 620 of the Acts of 1956, creating the Water Resources Commission, is appended.

APPENDIX

CHAPTER 620

THE COMMONWEALTH OF MASSACHUSETTS

In the Year One Thousand Nine Hundred and Fifty-six

AN ACT ESTABLISHING IN THE DEPARTMENT OF NATURAL RESOURCES A WATER RESOURCES DIVISION AND DEFINING THE POWERS AND DUTIES OF SAID DIVISION.

Whereas, The deferred operation of this act would tend to defeat its purpose, which is to establish forthwith a division of water resources in the department of natural resources under the control of the water resources commission which shall be the agent of the commonwealth in coordinating all activities of federal, state and other agencies in the conservation, development, utilization and disposal of water for the purpose of preventing loss of life and damage to property by erosion, floodwater and sediment in the watersheds of the commonwealth, and to obtain necessary financial assistance from the federal government, therefore it is hereby declared to be an emergency law, necessary for the immediate preservation of the public safety and convenience.

Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of same, as follows:

Section 1. The fourth paragraph of section 1 of chapter 21 of the General Laws, as appearing in section 1 of chapter 631 of the acts of 1953, is hereby amended by striking out the third sentence and inserting in place thereof the following sentence:—There shall be established a division of fisheries and game and a division of water resources, within the department, but not under the supervision and control thereof.

Section 2. Section 2 of said chapter 21, as so appearing, is hereby amended by striking out the first sentence and inserting in place thereof the following sentence:—The department, with the exception of the division of fisheries and game and the division of water resources, shall be under the control of a board of natural resources, which shall consist of five members appointed by the governor, with the advice and consent of the council, for terms of five years.

Section 3. Said chapter 21 is hereby further amended by adding after section 7H, under the caption DIVISION OF WATER RESOURCES, the following eight sections:—*Section 8.* The division of water resources shall be under the supervision and control of the water resources commission, hereinafter in this section and in sections nine to fifteen, inclusive, called the commission, which shall consist of the commissioner of agriculture, the commissioner of commerce, the metropolitan district commissioner, the commissioner of natural resources, the commissioner of public health, the commissioner of public works and three persons to be appointed by the governor, with the advice and consent of the council. The three persons appointed by the governor shall each represent a different major type of water user. Any member ex officio may designate a person

to act as his representative at meetings of the commission and, in so far as practicable, such member shall designate the same person for each such meeting. Upon the expiration of the term of office of an appointive member of said commission his successor shall be appointed, in like manner, for a term of three years.

Section 9. The commissioner of natural resources shall be the chairman of the commission. The commission shall meet and consult on matters concerning watersheds, water systems, storage basins, and shall study the needs, supplies and resources of the commonwealth with respect to water conservation and flood prevention. The commission shall hold hearings for these purposes at times and places convenient to the public and shall from time to time make recommendations for legislation designed to provide the commonwealth with a basic water policy based upon the common and interdependent interests of agriculture, industry, recreation, wild life, conservation, domestic consumption and flood prevention. It shall act as a co-ordinating agency between all departments of the commonwealth and shall co-operate with the agencies of the federal government and all other states in carrying out water conservation and flood prevention programs. It shall be the agency of the commonwealth having supervisory responsibility over programs provided for by the Watershed Protection and Flood Prevention Act (Public Law 566—83d Congress 2nd Session), and shall carry out, maintain and operate any works of improvement authorized by said federal act and as limited by section fourteen; provided, that it shall not be an applicant for assistance under said federal act. The term "works of improvement" as used in this section and in sections ten to fifteen, inclusive, shall mean any undertaking for (1) flood prevention, including structural and land treatment measures, or (2) agricultural phases of the conservation, development, utilization and disposal of water in watershed or sub-watershed areas not exceeding two hundred and fifty thousand acres and not including any single structure which provides more than five thousand acre-feet of total capacity. A number of such watersheds when they are component parts of a larger watershed may be planned together when the local sponsoring organizations so desire. The term "local organization" in this section and in sections ten to fifteen, inclusive, shall mean any political subdivision of the commonwealth, or soil conservation district, or combinations thereof.

Section 10. The commission shall meet on the second Monday of each month and may meet more often as the members may determine. The members of the commission may be reimbursed for expenses incurred in connection with their duties and the three appointive members of the commission shall, in addition to their expenses, receive fifteen dollars per day for each day of service to said commission but the total amount payable to such appointive member shall not exceed three hundred and sixty dollars in any calendar year.

Section 11. The commission may employ such technical and clerical assistance and consultants as may be necessary, and may utilize the services of technical and clerical employees of the several departments of the commonwealth.

The commission may establish such rules and regulations as may be necessary for the proper administration of sections nine to fifteen, inclusive, and shall annually submit to the budget commissioner the estimates required by sections three and four of chapter twenty-nine, and shall file an annual report as required by sections thirty-two and thirty-three of chapter thirty.

Section 12. Applications for assistance under the federal Watershed Protection and Flood Prevention Act shall be initiated by the local organization, and may not be initiated by the commission. Such applications shall be filed with the commission, which may disapprove the same within forty-five days from the date of filing. The commission may give approval only to applications submitted by local organizations, but any local or regional voluntary citizens' group, established under chapter one hundred and eighty for the purpose of furthering water conservation and flood prevention, may join with any local organization in making application to the commission for assistance under the federal Watershed Protection and Flood Prevention Act.

Section 13. The commission shall require, as a condition to providing assistance from the commonwealth for the installation and operation and maintenance of works of improvement, that local organizations shall (1) assume responsibility for all planning for works of improvement to be constructed within the watershed area, but the local organization may, nevertheless, request, through the commission, technical advice from any appropriate agency of the commonwealth; (2) acquire, in the name of the commonwealth, and without cost to the commonwealth, such land, easements or rights of way as will be needed in connection with works of improvement installed with the assistance of the commonwealth; (3) acquire, or provide assurance that landowners have acquired, such water rights, pursuant to the laws of the commonwealth, as may be needed in the installation and operation of the works of improvement; and (4) obtain agreements to carry out recommended soil conservation measures and proper farm plans from owners of not less than fifty per cent of the lands situated in the drainage area above each retention reservoir to be installed with the assistance of the commonwealth.

Section 14. At such time as the United States Secretary of Agriculture and the interested local organization have agreed upon a plan for works of improvement, the commission may (1) assume such proportionate share of the non-federal cost of installing any works of improvement involving federal assistance as it determines to be equitable in consideration of anticipated benefits from such improvements; provided, that no part of the construction cost for providing any capacity in structures for purposes other than flood prevention and features related thereto shall be borne by the commonwealth; and (2) make arrangements, through the local organizations satisfactory to the said Secretary of Agriculture for defraying the costs of operating and maintaining such works of improvement, in accordance with regulations presented by the said Secretary of Agriculture. In order to carry out the provisions of the above clause (1) the commission shall be the contracting authority for the construction of any works of improvement

involving assistance from the commonwealth, but shall designate the appropriate department or departments of the commonwealth or subdivision or subdivisions thereof as the agent or agents of the commission for the purpose of making such contracts or performing the work of construction; provided, that whenever the said works of improvement involves stream clearance, channel improvement or construction of dams the commission shall designate the division of waterways in the department of public works as the contracting agent, except that when the work to be done involves property under the care and control of the metropolitan district commission the commission shall designate the said metropolitan district commission as the contracting agent. In order to carry out the provisions of the above clause (2) the commission is authorized to assume such proportionate share of the costs of operation and maintenance of said works of improvement as it determines to be equitable in consideration of anticipated benefits from such improvements. In order to insure the continued operation and maintenance of any and all works of improvement that have been installed with the assistance of state funds, the commission is authorized and directed to designate as its agent or agents for this purpose the department or departments of the commonwealth or the subdivision or subdivisions thereof which constructed or contracted for the construction of said works of improvement.

Section 15. At such time as the United States Secretary of Agriculture and the interested local oragnization have agreed upon a plan for works of improvement, and the local organization has met the requirements for receiving assistance from the commonwealth in installing, operating and maintaining the works of improvement as set forth in section fourteen, the commission shall request the general court to appropriate such sums of money as are needed to meet (1) the share of the non-federal cost of installing the works of improvement and (2) the share of the cost of operating and maintaining said works of improvement, which the commission proposes to assume under the provisions of section fourteen. Any funds received from local organizations or any other source, including funds made available by the federal government, shall be in addition to funds made available to the commission by the general court. With respect to all projects for which funds of the commonwealth have been appropriated as partial or total payment of the non-federal share of the costs of constructing, operating or maintaining the proposed works of improvement, the commission shall be the recipient of any federal, state, or local funds appropriated for such projects. Funds made available from any source for a specific project shall be held by the commission for said project, and may not be allocated to any other project. Nothing in this section or in section fourteen shall be construed to prevent or limit a local organization from assuming the full amount of the non-federal share of the cost of installing any works of improvement.

Section 4. Nothing in sections eight to fifteen, inclusive, of chapter twenty-one of the General Laws, inserted by section three of this act, is intended to change or modify any of the existing powers of any department, agency or subdivision of the commonwealth.

PROCEEDINGS

Diamond Jubilee Convention
(1882-1957)

Hotel Statler, Boston, Mass.

September 15-18, 1957

The Diamond Jubilee Convention of the New England Water Works Association was held at Hotel Statler, Boston, Mass., on September 15, 16, 17 and 18, 1957. The convention began with registration and a get-together on Sunday evening, September 15.

Monday, September 16

Morning Session

President Edward L. Tracy in the Chair.

The Annual Reports of the Secretary, Treasurer, Editor, Committee on Membership, Finance Committee, Scholarship Committee, Committee on Committees, Committee on Legislation, and Committee on Reciprocal Relations with the Institution of Water Engineers were presented and accepted.

The President declared the polls closed and appointed as Tellers of Election Thomas S. Lawrence, *Chairman,* Clifton E. Hodgdon and Emery S. Littlefield.

The following reports of technical committees were presented and accepted: Committee on Specifications for Cast-Iron Pipe and Fittings, Committee on Laying Cast-Iron Pipe, Committee on Standardization of Pipe Flanges and Fittings, Committee on Federal Activities, Committee on Conservation, Development and Utilization of Water Resources, and Committee on Publicity. All formal reports are published in this issue of the Journal.

Afternoon Session

A paper on "Development in Equipment for Water Works in New England" was read by R. S. Rankin, Consultant, Dorr-Oliver, Inc., Stamford, Conn.

A paper on "Do You Buy Price or Value?" was read by Morris M. Cohn, Editorial Director, Water Works Engineering, New York, N. Y.

A paper on "Algae and Other Interference Organisms in New England Water Supplies" was read by C. Mervin Palmer, Robert A. Taft Sanitary Engineering Center, U. S. Public Health Service, Cincinnati, O.

Evening

A New England Folk Festival was held in the ballroom of the hotel, with square dancing for members and guests, interspersed with demonstrations by professional dance teams and foreign dance groups in their native costumes. The festival was sponsored by the Water and Sewage Works Manufacturers Association.

TUESDAY, SEPTEMBER 17

Morning Session

President Tracy in the Chair.

Secretary Knox announced the election by the Executive Committee of the following new members: Howard B. Allen, Edward J. Bayon, Jack C. Brinton, Robert H. Culver, Thomas J. Fleming, Emery W. Goodwin, Richard E. Gorman, Joseph B. Hanlon, Harold E. Langley, Jr., Maurice V. Murphy, Jr., James T. O'Neil, Philip K. Reddy, Frank L. Rice, Hamilton Rumrill, James M. Symons, C. R. Winchester.

A paper on "New Water Treatment Plant for Billerica, Mass." was read by Thomas R. Camp, of Camp, Dresser & McKee, Consulting Engineers, Boston, Mass.

A paper on "Performance of the Billerica Water Treatment Plant" was read by Barbara E. Hawkes, Water Chemist, Department of Public Works, Billerica, Mass.

A paper on "New England's Contributions to the Water-Works Profession" was read by E. Sherman Chase, Partner, Metcalf & Eddy, Consulting Engineers, Boston, Mass.

Afternoon Session

This session was devoted to a Superintendents' Gab-Fest, with William H. McGuinness, General Superintendent, Water Department, Cambridge, Mass., as moderator.

The discussion was participated in by Francis N. O'Hara, Sherman L. Rogers, Kenneth E. Bender, Roger G. Oakman, Sydney C. Beane, Peter C. Karalekas, James D. Halwartz, Clifton E. Hodgdon, Vernon L. Packard, Darrell A. Root, Kenneth J. Carl, Samuel Wylie, Kenelm Eden, Richard H. Ellis, Edward V. O'Donnell and Harry Miller.

Evening

A Diamond Jubilee Revue was held in the ballroom. The New England Water Works Association presented outstanding acts from famous supper clubs and TV programs, followed by dancing, with music by Guy Ormandy's society orchestra.

WEDNESDAY, SEPTEMBER 18

Morning Session

This session was devoted to a panel discussion on "Seventy-five Years of Water-Works Progress in New England." George G. Bogren, Weston & Sampson, Consulting Engineers, Boston, Mass., was the moderator, and participants were the chief sanitary engineers of the New England States, as follows: Dr. Elmer W. Campbell, Maine; William S. Healy, New Hampshire, by Richard P. Grossman; Warren J. Scott, Connecticut; Walter J. Shea, Rhode Island; Clarence I. Sterling, Massachusetts; Edward L. Tracy, Vermont.

Afternoon Session

A 16-mm color sound film, "Lifelines for Civilization," showing the general historical background, condensed to permit a more detailed discussion of modern applications, of pressure pipe, was shown through the courtesy of the Lock Joint Pipe Co., East Orange, N. J.

A paper on "Evaluation of 'Miracle' Water Conditioners," prepared by Prof. Rolf Eliassen and Rolf T. Skrinde, Research Associate, Massachusetts Institute of Technology, Cambridge, Mass., was read by Prof. Eliassen.

A paper on "Actual Trends in Water Supply and Sanitary Engineering in Europe" was read by Prof. W. F. J. M. Krul, Director, Government Institute for Water Supply, The Hague, Netherlands.

A paper on "The Geohydrology of New England" was read by Rev. Daniel Linehan, S.J., Weston Observatory, Weston, Mass.

Evening

A banquet was served in the ballroom of the hotel, with the compliments of the Water and Sewage Works Manufacturers Association.

After the wine was served:

PRESIDENT TRACY. May I present Mr. E. Sherman Chase, who wishes to propose a toast.

E. SHERMAN CHASE. Mr. President, ladies and gentlemen, will you please rise? [*Everybody stands.*]

I propose this toast to the illustrious members of the past of this Association, to the glorious heritage which we have received from them, and to the glorious future to which the New England Water Works Association is destined.

Ladies and gentlemen, I give you the New England Water Works Association. [*Applause.*]

PRESIDENT TRACY. Now I have some messages for this Association to read to you.

From the American Water Works Association:

"The Executive Committee of the American Water Works Association, on behalf of the Association's Board of Directors and membership, extends fraternal greetings to the New England Water Works Association on the occasion of its 75th Anniversary.

"Your organization has, throughout its long history, contributed greatly to the advancement of public water supply and the recognition by the public of dependable water service.

"Your Association and its members have our very best wishes."

Signed by the American Water Works Association, by the Executive Committee of the Board, headed by President Fred Merryfield. I believe that President Merryfield is in our midst. Will you please stand, President Merryfield?

[*Mr. Merryfield stands; applause.*]

From the New England Sewage and Industrial Wastes Association:

"Dear Compatriots:

"On this happy occasion of your Diamond Jubilee, we join in extending our congratulations upon the manner with which you have served the best interests of the Water Works Profession and the citizens of New England during the past three-quarters of a century.

"We extend sincere wishes for your continued success in the years ahead. May the next 75 years be as glorious as the past.

"Sincerely,

"New England Sewage and Industrial Wastes Association,

by CLAIR N. SAWYER, *President.*"

Is President Sawyer here; if so, will he please stand?

[*Mr. Sawyer stands; applause.*]

I have a lot of additional messages here. There are too many of them for me to read now, but they are from the Governors of the New England States and our Massachusetts Senators. They are all letters of congratulation, sincerely wishing us the best on our anniversary, and extending the best wishes for the future. They are from Governor Muskie of Maine, Governor Dwinell of New Hampshire, Governor Johnson of Vermont, Governor Furcolo of Massachusetts, Governor Roberts of Rhode Island, and Governor Ribicoff of Connecticut; from United States Senators Saltonstall and Kennedy of Massachusetts, and from Mayor John B. Hynes of Boston.

Now I should like to call on the Vice-President of the Boston Society of Civil Engineers, Mr. William L. Hyland, who has a message for you.

WILLIAM L. HYLAND. Mr. President, officers and members of the Association: It gives me pleasure tonight to say to you that the Board of Governors of the Boston Society of Civil Engineers extend their best wishes on this occasion. I like to feel that in expressing these thoughts perhaps they mean a little more than ordinarily, because many of our members are your members, and in many respects our programs are similar. I understand that way back in the early days most of the organizers of this Association were members of the Boston Society of Civil Engineers.

Now, the Board of Governors has had prepared a plaque which reads: "The Boston Society of Civil Engineers extends greetings and felicitations to the New England Water Works Association on the 75th year of the Association." I take great pleasure in presenting that to your president [*handing plaque to President Tracy; applause*].

PRESIDENT TRACY. Mr. Hyland, it is a great pleasure and an

honor to me, on behalf of this New England Water Works Association, to accept greetings from your organization. I thank you.

A few minutes ago I introduced Professor W. F. J. M. Krul to you as our honored guest. Professor Krul is director of the Government Institute for Water Supply, The Hague, Netherlands. He has come to us at this meeting, has spoken with us, and presented a paper here this afternoon. It has been a pleasure to know him, and we have benefited and will continue to benefit from the message which he has brought to us concerning the water systems of Europe.

Professor Krul, it is a great pleasure to me personally and a great honor to present to you this honorary membership in the New England Water Works Association [*handing certificate*]. I hope you will be back with us again soon. We look forward to having you here. [*Applause.*]

PROFESSOR W. F. J. M. KRUL. Mr. President, ladies and gentlemen: May I have the pleasure to say to you in a very few words how much I appreciate the high honor you have bestowed upon me.

Of course I have to express myself in a foreign language, and it has its difficulties. I have often traveled all over Europe and there I am accustomed to speak languages like Egyptian, Austrian, or Swiss, but to speak English is rather difficult.

I remember that one of my countrymen learned by heart an English speech, and he delivered it in England for his maiden speech at a dinner. After he had finished the president said to him, "Well, sir, I did not know that Dutch was so much like English; I almost understood every word." [*Laughter.*] If my Dutch is so much like English that you can understand me, I shall be very much pleased.

I would not like to speak too much from my personal behalf, because I quite well understand that the honor you have given me—the honor to be an honorary member of one of the oldest societies in the field of water supply, the New England Water Works Association, which has been in the past and is in the present one of the leading societies in the world—I quite feel that my modest personality is not the reason that you have given me this honor. I feel that you have honored your colleagues in Europe, and although I can't speak in the name of Europe, I still can say that we in Europe have a great respect and a great friendship, and desire the best understanding possi-

ble with our colleagues. Our world is getting smaller and smaller every day, and we need each other so badly.

Well, I think that many times I have had the pleasure to visit America. I have found that there were differences in feelings on both sides of the Atlantic, and it may seem strange but I understood these questions better when I had seen the eastern countries, and I said to my country people, "The best way to understand the Far West is to go to the Near East." And why? Because I was in Lebanon, and I found there the roots of all this civilization that is our proudness and our wisdom in Europe. I found that when we thought of all our culture, it was the Greek culture—Greek and Christian. The roots I found there in the Near East. And then I understood that for you who have come from Europe, and who came to the new world to build a real new world and a new civilization, that still your roots are from the eastward, in Europe and also in the East. This is what unites us when we are aware of the roots of our civilization, of our history, and it gives us a basis for brotherhood, for friendship and for co-operation. In this sense, ladies and gentlemen, I am very thankful for this token of friendship from this side of the Atlantic, from the New England Water Works Association.

Now, Mr. President, I also feel that you see in me, first, an European. But as I said, I can't speak in the name of Europe. On the other side I can speak in the name of my countrymen. You as Yankees will perhaps think of knickerbockers. We have in our country two societies in the field of water supply, in the same way as they have in England. We have an association for the water works, in which only water works are corporate members, and then we have societies, like the English Institution of Water Engineers, for the persons.

Those societies have asked me to submit to you their hearty congratulations, and if you will permit me, Mr. President, I should like to read you some letters. First may I read to you the message of the Water Works in the Netherlands:

"In the name of the Netherlands Waterworks Association we congratulate the New England Water Works Association with her respectable jubilee. We are bound with you by a common ambition to work in the general interest, and by a congenial culture. By bestowing the Honorary Membership upon our compatriot, Professor Willem Krul, we participate in a particular way in your fes-

tivity. Your acknowledgment of Professor Krul's merits affords us great pleasure.

"We are sure that the New England Water Works Association will continue to fulfill its valuable task for a long time to come." [*Applause.*]

Then, Mr. President, I have here a message of the Water Institution:

"The Board of the Vereniging Voor Waterleidings Belangen in Nederland gladly offer their sincere congratulations on the occasion of the 75th anniversary of your Association, combining these with the wish that your Association may flourish and bloom for the years to come and remain a continuous support to all those who serve the waterworks profession.

"'Our Board decided to present the New England Water Works Association with the Medal of our Association as a tangible token of appreciation of the task having been carried out by the New England Water Works Association during the past 75 years.

"It is highly valued by our Board that this medal be personally presented by our Member of Honour, Prof. W. F. J. M. Krul, during the meeting to be held in September." [*Applause.*]

Well, Mr. President, I will just offer to you the medal with the special inscription of the Union of Water Engineers in Holland. I thank you. [*Applause.*]

PRESIDENT TRACY. Professor Krul, you know that this comes to me as a surprise. It is a great surprise, but it is a great pleasure and a great honor to accept these messages and this medal, which Professor Krul has bestowed on this Association.

I thank you, Professor Krul. [*Applause.*]

Now I call on the chairman of the Award Committee, Mr. I. Laird Newell, to present the awards. These are the Dexter Brackett Memorial Medal and the Commemorative Award. Mr. Newell.

AWARD OF THE DEXTER BRACKETT MEMORIAL MEDAL

I. LAIRD NEWELL. Mr. President, members and guests of the Association: At the 35th Annual Convention of the New England Water Works Association, held in September, 1916, at Portland, Me., a memorial award was established to honor the memory of a man who contributed greatly to the water-works profession and this Association. This man was Dexter Brackett, born in Newton, Mass., in 1851 and educated in the public schools of Newton and Brighton. He had no formal engineering education but became affiliated with the City Engineer's office in Boston as his first job. Mr. Brackett soon was assigned to water-works problems, and early in his career he became in charge of the distribution system.

He became a member of the New England Water Works Association in 1885, was made Vice-President in 1889, President in 1890, and Senior Editor of the Journal from 1891 to 1895. He contributed many papers to the Journal and was active in promoting the growth of the association.

In 1895 the Metropolitan Water Works was organized, and Mr. Brackett was chosen as engineer of the distribution department, which position he held until 1907, when he became Chief Engineer of the Metropolitan Water Works. In addition, he was consulting engineer for a number of other municipalities. Among his more important works are the specifications for cast-iron water pipes and special castings.

This year the committee, consisting of Dr. Donald R. F. Harleman of M.I.T., Harold J. Toole of the Water Division, Metropolitan District Commission, and myself, have selected the paper entitled "The Analysis of Complex Water-Works Distribution Networks," by Edwin B. Cobb, as the most meritorious for the year 1956. [*Applause.*]

Mr. Cobb, it is my pleasure, on behalf of the New England Water Works Association, to present to you the Dexter Brackett Memorial Medal, and I offer you my personal congratulations.

EDWIN B. COBB. It is both a pleasure and an honor to receive this medal. Network analysis has been something of a hobby of mine for many years. I am particularly gratified to know that the hobby is a benefit to the profession. There is a lot to be done on this subject to bring it down to the level of the ordinary water-works engineer. I only hope that in the future I can be of further assistance. I thank you. [*Applause.*]

COMMEMORATIVE AWARD

I. LAIRD NEWELL. At the 68th Annual Convention of this Association, held in September, 1949, it was decided to have an additional award for meritorious papers, which was to be in memory of members who have been prominent in the several fields of the water-works profession.

This year the award is in memory of Harry W. Clark, who from 1898 until his retirement in 1933 was in charge of the Lawrence Experiment Station of the Massachusetts Department of Public Health and was an outstanding authority on the operation of water- and sewage-treatment plants.

Renowned for his studies and investigations relating to the treatment of water and sewage, he was author of sixteen technical papers published in the Journal of this Association. In 1927 he was recipient of the Dexter Brackett Memorial Medal. He had been a member of this Association since 1894 and was elected to honorary membership in 1929.

This year the award committee has chosen the paper entitled "Integrated Equipment for Water-Works Operation Control," by Henry M. Mautner, to merit the Commemorative Award for the year 1956. [*Applause.*]

Mr. Mautner, it is my pleasure on behalf of the New England Water Works Association to present to you the Commemorative Award, and I offer you my personal congratulations.

HENRY M. MAUTNER. I thank you very much, Mr. Chairman. I assure you that I am deeply touched, and I hope I deserve it. I do not want to keep you in suspense here, but I just want to say that giving me the award is a tribute to the New England Water Works Association, to their international credit. As you know, I came from Europe. I am an American at heart, but I am afraid of coming down with the Asiatic flu. [*Laughter and applause.*]

* * * *

PRESIDENT TRACY. Now we have some 25-year certificates to give out. These are for water-works officials who have served the

municipality for 25 years and have been a member of the New England Water Works Association for 25 years.

Roger G. Oakman, Superintendent of the Water Department, Needham, Mass. [*handing certificate to Mr. Oakman; applause*].

Harold E. Watson, Commissioner of Water Department, Newport, R. I. Is Mr. Watson with us? [*No response.*]

Time goes by very fast and it is almost time for you to fire me.

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Roger G. Oakman, Superintendent of the Water Department, Needham, Mass. [*handing certificate to Mr. Oakman; applause*].

Harold E. Watson, Commissioner of Water Department, Newport, R. I. Is Mr. Watson with us? [*No response.*]

Time goes by very fast and it is almost time for you to fire me.

PRESIDENTIAL ADDRESS

By Edward L. Tracy

This has been a very wonderful year for the New England Water Works Association, a fittingly outstanding year to observe the 75th Anniversary. This convention is a climax, a fitting climax to that year. We have a registration of 790 at this convention, and that is by a wide margin the largest registration we have ever had at any meeting or any convention. [*Applause.*]

For me personally, of course, it has been a very wonderful year. It has been a high point of my life in connection with water-works systems. Nothing that has ever happened to me, or nothing that can happen in the future, will equal the pleasure which I have derived and the honor which I have felt in serving as your president.

Now, this outstanding year should merit some very worthy remarks in a presidential address, but in trying to formulate some ideas to give to you I found myself continually distracted by remembering what has been going on during the year and how much I was obligated to a great many people. All of our meetings have been outstanding successes, and a lot of people contributed to them. I feel that I should thank all of those people, but after all I can't stand here and thank over 1,100 people. That would be a long speech.

It is perhaps a unique coincidence that your presidential official during this very important year has been just about as far away from Boston as he could and still be in New England. Of course you know that absentee management is not too efficient. Somebody has to be around to mind the store, you know. And so I am especially thankful for those who have been minding the store, the same ones who have been doing such a wonderful job for quite a number of years now. You all know, of course, that I am referring to Joe Knox and Alice Melrose.

I also want to express my thanks to all the officers, the vice-presidents, the directors, the past presidents, the treasurer, who have been very conscientious and have served as an excellent Executive

Committee for your organization. They, of course, formulate the policies and control your finances, and you certainly have nothing to worry about.

Then there are all of the committees that do so much during the year, many of which presented reports at the technical session to this convention. Of course I want to thank all those committee members.

But there are two that have done a great deal of work. One is the Program Committee and the Program Committee chairman. They have had to arrange all the meetings during the year, and certainly those of you who have been at this convention realize what a wonderful job they have done for this convention, and they have done equally well throughout the year.

Another committee that I want to give special thanks to is the Scholarship Fund Committee. That is a new committee, which was not appointed until November—their year began actually in December—and they set up for themselves a very ambitious program. They were trying to reach a very ambitious goal by this convention. I think they did wonderfully well in collecting as much as they did for the Scholarship Fund, and they are well on the way up to that point when the proceeds of the fund can be used for scholarships.

I think next the people that I owe a lot to are those who have been responsible for special meetings throughout the year. Most of you remember, if you were there, the meeting in April at the Bridgeport Hydraulic Company, observing their 100th anniversary, when they gave us a wonderful meeting, treating us as a big brother should, probably, and that was the most outstanding April meeting, I am sure, that we have ever had.

In May the Air Force extended a wonderful program to us at the Air Base in Portsmouth. Then in June we had our largest June meeting that we ever had, and for that we are indebted to the manufacturers and their representatives.

To all those who gave papers at the meetings during the year and at this convention, and to those water superintendents and chemists who participated in their sessions, I also want to express my thanks. I know that it is sometimes not easy to bring yourself to the work which is necessary to do the things that will benefit the other members.

To all those on the program in this convention, those who gave papers during the three days—this has been a wonderful program, many excellent papers were given—and to all those people we owe our gratitude.

I have left until last the group that probably deserves as much thanks as anybody else, and that is the Water and Sewage Manufacturers Association—the manufacturers themselves and their representatives, the supply men and the dealers. You superintendents see them throughout the year. You realize how much they do for you in your work program of the year. You know that they help you a lot. These meetings, which we keep referring to as being very outstanding, could not possibly be the success they are without the help that the manufacturers and their staffs give to us. Their help is more than substantial.

Now, just in case I have forgotten to thank anyone I shall say to everyone, thanks for everything.

That should bring me around to the point where my mind is clear of obligations, and I can give a few remarks which I shall flatteringly call the presidential address.

At the time that this organization was founded some 75 years ago, and for a long time before that, it was customary to refer to anniversaries by names by increasing the value with age. That is, the first two anniversaries were designated by objects or materials of small value, and then as time went on the people referred to their anniversaries by something of greater value. Now, I remember that at that time the average life span was only about 40 years, more or less, for different localities, so that 25 years was quite a long time to look forward to an anniversary, and the people at that time assigned to that the name Silver Anniversary, which to the average person was something of great value—probably as high as the average could hope to attain.

And for fifty, which was beyond the life span of the average person, they assigned the name of what to them was the most precious metal, and that they referred to as the Golden Anniversary.

The highest that they could assign by such a name, of course, was the 75th Anniversary, and they gave to that the name Diamond Jubilee. That was something practically unattainable for the average

person; it was almost double the average life span. The individual could not look forward to reaching that 75th anniversary; only something like an organization of great strength could hope to achieve a 75th anniversary.

Well now, we have reached that point. We have reached that point which probably seemed unattainable to those 27 people who 75 years ago organized this association here in Boston. I think it is very fitting that we should be back here in Boston 75 years later, when we have reached what probably to them was something that they hardly dared hope for.

Now that we are at 75 years what is ahead? Well, now we begin talking in centuries or centennials, and we of course can look forward to our centennial. But the important thing in this whole program of the Association is not the mere fact that we have put in 75 years of life, that we have reached what may have been a seemingly unattainable goal in years only. The important thing is, have we accomplished what those original 27 people started out to try and do?

If we look at the first paragraph of the constitution of this Association we read that the objective then was the advancement of knowledge relating to water works and water supply and the encouragement of professional and social relations.

Well, I think we can feel that we have done enough so that that original objective still means as much to this Association as it did 75 years ago. Certainly the historical papers that were given at this Convention concerning both personalities and water department work show that great progress has been made during all of that time in knowledge relating to water supply and water works.

I like to think that it is quite significant that this scholarship plan which has been set up and which is just starting into operation will prove in the future that we at this time are looking forward, just as the original Association did, to the advancement of knowledge relating to water supply and the water-works field.

I do not think there is any doubt but what the encouragement of professional and social relations means as much now as it did then—probably more. The very meetings, as I keep referring to them as

outstanding and successful meetings of the past year—all of those were certainly complying with the original objectives. Here tonight we have extended the scope of that relationship on an international basis and have been very generously treated by the fellow associations in the Netherlands.

In looking forward, let us say, to the next 25 years—to the goal of our centennial—in order to accomplish this objective—I think there is no reason why that should not be the principal objective of the Association—I believe that we need additional help from the younger members. During the past year the membership did not gain at the rate which has been customary in the past few years. But I believe that we can bring into this Association enough good young members so that they will carry on this objective, and when they reach the centennial, the 100th anniversary, some of them will be able to supplement the papers given at this convention and show that the history of the Association between now and the 100th year will follow along in keeping with the 75 years' progress which has been outlined to us here at this convention. I know that it is not easy to attract as many good young men as we would like into the Association. I know that it is not easy for you superintendents to attract as many good young men as you would like into your organizations to work with you, but I think we should make this a special goal during the coming years, and if we do, if we are successful, I am sure that they will be telling the audience at that centennial that the original objective of advancement of knowledge relating to water supply and water works has progressed and has been upheld during this period of development.

I thank you. [*Applause.*]

* * * *

PRESIDENT TRACY. Now I want to call on Mr. Thomas Lawrence, Chairman of the Tellers of Election, for his report on the count of the ballots.

THOMAS S. LAWRENCE. At this time I should like to submit the report of the Tellers of Election for officers of the New England Water Works Association for the ensuing year:

REPORT OF THE TELLERS OF ELECTION

FOR PRESIDENT:	George G. Bogren	362 votes—2 blanks
FOR VICE-PRESIDENT:	Warren Gentner	358 votes—6 blanks
FOR DIRECTOR:	Walter J. Shea	358 votes—6 blanks
FOR TREASURER:	William P. Melley	360 votes—4 blanks

Respectfully submitted,

(*Signed*) THOMAS S. LAWRENCE, *Chairman*
CLIFTON E. HODGDON
EMERY S. LITTLEFIELD

PRESIDENT TRACY. Thank you, Mr. Lawrence. I declare that these persons are elected as the officers of your Assocation:

President, GEORGE BOGREN
Vice-President, WARREN GENTNER
Director, WALTER J. SHEA
Treasurer, WILLIAM P. MELLEY

One of these is a new officer, and that is Walter J. Shea. Will he stand?

[*Mr. Shea stands; applause.*]

My script has been all right since that interruption by Professor Krul, which I did not expect.

Now I have come to the end of the line, and to Mr. Bogren, your new president, I offer my sincere wishes for as good a year as I have enjoyed. I know that the members of this organization, George, are going to do everything you wish to make it just that. Your president, George Bogren. [*Applause.*]

President George G. Bogren in the Chair.

PRESIDENT BOGREN. Mr. President, fellow members, ladies and gentlemen: It goes without saying that I feel very deeply honored and privileged to be chosen your president for the coming year. I shall have time during the year, and a year from tonight, to speak to you more fully, so that I am not going to take the time to do it now, except merely to say, thank you very sincerely.

I have one or two brief chores to do at this time. One of them

is a very pleasant one, and that is to present the past-president's certificate to the retiring president, Mr. Tracy. This merely is a certificate which states that you have served a year as president of this Association, and I hope, sir, that it may provoke enough thought now and then to bring back pleasant memories to you. [*Handing certificate to Mr. Tracy.*]

MR. TRACY. Thank you, George.

PRESIDENT BOGREN. The second chore I have is to announce that after this meeting dancing will follow. I now declare the meeting officially adjourned. [*Applause.*]

ANNUAL REPORT OF THE SECRETARY

August 31, 1957

Mr. President, and Members of the New England Water Works Association:

The Secretary herewith submits the following report of the changes in the membership during the past fiscal year, and the general condition of the Association.

The present membership is 1,103, constituted as follows: 11 Honorary Members, 912 Members, 144 Associates and 36 Corporate Members.

MEMBERSHIP				Total
Sept. 1, 1956—Honorary Members				11
Members, total		927		
Withdrawals:				
Died	22			
Dropped	15			
Resigned	34	71	856	
Elections:				
September 18, 1956	4			
October 19, 1956	6			
November 15, 1956	3			
December 20, 1956	8			
January 17, 1957	1			
February 21, 1957	8			
March 21, 1957	3			
April 18, 1957	6			
May 16, 1957	4			
June 13, 1957	3			
August 16, 1957	9			
Junior Member, Aug. 16, 1957	1		56	912

Sept. 1, 1956—Associates, total		143		
Withdrawals:				
Dropped	1			
Resigned	6	7	136	
Elections:				
September 18, 1956	1			
October 19, 1956	1			
April 18, 1957	4			
May 16, 1957	1			
August 16, 1957	1		8	144
Sept. 1, 1956—Corporates, total		36		
Withdrawals:				
Resigned	1	1	35	
Elections:				
April 18, 1957	1		1	36
September 1, 1957—Total Membership				1,103
September 1, 1956—Total Membership				1,117
Loss of				14

ELECTIONS

Members

September 18, 1956—Bruce P. Eaton, Edmund J. Laubusch, Frederick W. Merrill, Herman H. Winter. (4)

October 19, 1956—H. Irving Charnock, Henry G. Crabtree, Mrs. Barbara E. Hawkes, James C. Jones, Kenneth O. Macomber, Leslie O. Marden. (6)

November 15, 1956—William T. Sherman, John W. L. White, Harry M. Wooster. (3)

December 20, 1956—Harold Bateson, Alfred F. Bridgman, Norman E. Jackson, Irving J. LaMay, Richard W. LaMay, Myrl R. Limeburner, Charles A. Manganaro, Vito F. Pennacchio. (8)

January 17, 1957—Ralph I. Larson. (1)

February 21, 1957—Donald W. Bodge, Edward F. Capaldi, Morris M. Cohn, Robert E. Galpieau, Robert T. Koopman, William W. Wedge, Walter M. White, George R. Winters. (8)

March 21, 1957—Lawrence K. Engdahl, Henry G. Quinn, William H. Spaulding, Jr. (3)

April 18, 1957—Paul E. Bernier, Burton S. Griffin, David W. Miller, Wilfrid Sanderson, J. Samuel Slicer, Jr., Clayton S. Turnbull. (6)

May 16, 1957—Leslie I. Atwood, Walter A. Blasenak, Charles W. Harris, William J. Mendoza. (4)

June 13, 1957—Donald B. Burnell, George C. Nadeau, Charles D. Wood. (3)

August 16, 1957—Burdon H. Blanchard, Henry Cheetham, Jr., David H. Giammarco, Charles E. Knox, Victor E. Miller, Francis J. O'Brien, Richard W. Souza, Robert L. Taylor, Harry W. VanGeenhoven. (9)
Junior Member: Frank A. Wyskiel. (1)

Associate Members

September 18, 1956—R. H. Smith Supply Company. (1)

October 19, 1956—Preload Concrete Structures, Inc. (1)

April 18, 1957—J. B. Byrne Company, Crane Company, Daniel L. Jerman Company, Western Waterproofing Company. (4)

May 16, 1957—Hosmer R. Kimball Company. (1)

August 16, 1957—Foster Engineering Company. (1)

Corporate Members

April 18, 1957—Sudbury Water District. (1)

WITHDRAWALS

Members

Died—Albert E. Brown, John P. Capaldi, Horace L. Clark, Richard F. Comerford, G. Lewis Covell, Gorham Dana, Carleton E. Davis, Edwin S. Evans, Benjamin E. Fox, Royal J. Goddard, Edwin C. Goehring, Valentine O. Ketcham, Gilbert E. Long, Samuel H. MacKenzie, John J. Murphy, Frederick Ohrt, William D. Paine, Fred P. Stradling, Edward L. Randall, George F. Rowell, Frank J. Thiery, Charles E. A. Winslow. (22)

Resigned—A. William Albert, Harry H. Angell, Ferd C. Arens, Cecil A. Bissonnette, Mathew M. Braidech, John D. Buckley, Harold I. Charnock, Arnold G. Carey, John J. Coleman, Henry J. DiMestico, Patrick J. Doran, Francis G. Duclos, William F. Duffy, Albert E. Feldman, Martin E. Flentje, Harold Fox, Clarence B. French, James E. Fuller, John E. Gahagan, Joan Goostray, Miles L. Harris, Lester B. Hull, J. Arthur Jackson, Harold D. Lamson, John E. Landers, Joseph Landers, Tracy B. Lord, Herbert D. Nickerson, Joseph M. Pierce, Earle L. Pike, Edwin A. Schmitt, Sumner Smith, Raymond E. Snow, Fred Shepperd. (34)

Dropped—Arthur H. Abbott, Albert H. Andrews, Abraham C. Bolde, Walter F. Burdick, Sebastian Cali, John K. Donnelly, James P. Donovan, Richard J. Kelley, Waldo I. Kenerson, Frank P. McNea, W. W. Morehouse, Paige B. Rand, Amedee R. Roy, Jerome L. Spurr, Stayley H. Trask. (15)

Associates

Resigned—Boston Edison Company, Connecticut Chlorine Products, Inc., Graver Water Conditioning Company, National Tube Company, Walsh Holyoke Fabricators Div., The Welsbach Corporation. (6)

Dropped—Donnelly Products Company. (1)

Corporates

Resigned—Gloucester Board of Water Commissioners. (1)

RECEIPTS FOR THE FISCAL YEAR SEPTEMBER 1, 1956, TO AUGUST 31, 1957

Entrance fees	$ 201.00
Dues, members of all grades	10,500.00
Dividends	428.78
Advertising	5,624.25
Subscriptions	836.26
Journals	146.63
Sale of plates	10.80
Membership certificates	40.50
Membership lists	7.50
	$17,795.72

There is due the Association:

Dues	$184.00
Advertising	71.25
	$255.25

Respectfully submitted,

(*Signed*) JOSEPH C. KNOX, *Secretary*

ANNUAL REPORT OF THE TREASURER

Boston, September 5, 1957

To William P. Melley, Treasurer
New England Water Works Association
Boston, Massachusetts

We have examined the statement of assets and funds and the statement of cash receipts and disbursements of the general fund and the scholarship fund of the New England Water Works Association for the year ended August 31, 1957. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

We traced all recorded receipts into the depositary banks, verified the general fund bank account and petty cash fund and the scholarship fund bank account as at August 31, 1957, and examined properly approved vouchers for all disbursements. On September 3, 1957, we examined the paid-up cooperative bank shares at the First National Bank of Boston, and we verified by direct communication the cash on deposit in savings banks.

In our opinion, the accompanying statement of assets and funds and the note thereon and the related statement of cash receipts and disbursements of the general fund and the scholarship fund present fairly the financial position of the New England Water Works Association at August 31, 1957, and the recorded cash receipts and disbursements for the year then ended, on a cash basis consistent with that of the preceding year.

(*Signed*) SCOVELL, WELLINGTON & COMPANY

STATEMENT OF ASSETS AND FUNDS (Exhibit A)

As at August 31, 1957

Assets

Invested funds assets			
Cash in savings banks			
Boston Five Cents Savings Bank	$ 5,359.86		
Provident Institution for Savings	5,401.37	$10,761.23	
Securities			
Braintree Co-operative Bank, 5 paid-up shares	$ 1,000.00		
Sandwich Co-operative Bank, 10 paid-up shares	2,000.00	3,000.00	$13,761.23
General fund assets			
Cash, First National Bank of Boston		$5,456.18	
In office		50.00	
		$5,506.18	
Furniture and fixtures		1,180.00	6,686.18
Scholarship fund asset			
Cash, Milton Co-operative Bank			7,361.98
			$27,809.39

Funds

Invested funds		$13,761.23
General fund		
Balance, August 31, 1956	$6,616.33	
Excess of receipts over disbursements, Exhibit B	69.85	
Balance, August 31, 1957		6,686.18
Scholarship fund, Exhibit B		7,361.98
		$27,809.39

Note: The statement above, prepared on a cash basis, includes dues received in advance, $6,947, and employees' withholding tax, $123.06. It does not reflect the following:

Accounts receivable, dues	$184.00
Due on account of advertising	71.25
	$255.25

No depreciation has been taken on furniture and fixtures.

STATEMENT OF CASH RECEIPTS AND DISBURSEMENTS (Exhibit B)

For the year ended August 31, 1957

General Fund

Receipts (exclusive of dues received in advance and employees' withholding tax)			
Initiation fees		$ 201.00	
Dues, 1956-1957 and prior years		3,553.00	
Interest		428.78	
From publication of Journal			
Advertisements	$5,624.25		
Subscriptions	836.26		
Sale of Journal	146.63		
Sale of plates	10.80	6,617.94	
Miscellaneous			
Membership certificates	$40.50		
Membership lists	7.50	48.00	
Total receipts			$10,848.72
Disbursements			
Publication of Journal			
Printing	$5,297.64		
Reprints	287.00		
Reporting	223.40		
Stationery and postage	242.92		
Editor's salary	750.00		
Sundry	41.24	$6,842.20	
General and administrative			
Salaries	$4,840.00		
Certificates of membership	21.25		
Printing, postage and stationery	250.98		
Office supplies and expense	35.50		
Office rent	1,260.00		
Electricity	90.77		
Telephone and telegraph	232.66		
Auditing	100.00		
Social security taxes	155.93		
Sundry	158.03	7,145.12	
Forward		$13,987.32	$10,848.72

STATEMENT OF ASSETS AND FUNDS (Exhibit A)

As at August 31, 1957

Assets

Invested funds assets			
Cash in savings banks			
Boston Five Cents Savings Bank	$ 5,359.86		
Provident Institution for Savings	5,401.37	$10,761.23	
Securities			
Braintree Co-operative Bank, 5 paid-up shares	$ 1,000.00		
Sandwich Co-operative Bank, 10 paid-up shares	2,000.00	3,000.00	$13,761.23
General fund assets			
Cash, First National Bank of Boston		$5,456.18	
In office		50.00	
		$5,506.18	
Furniture and fixtures		1,180.00	6,686.18
Scholarship fund asset			
Cash, Milton Co-operative Bank			7,361.98
			$27,809.39

Funds

Invested funds		$13,761.23
General fund		
Balance, August 31, 1956	$6,616.33	
Excess of receipts over disbursements, Exhibit B	69.85	
Balance, August 31, 1957		6,686.18
Scholarship fund, Exhibit B		7,361.98
		$27,809.39

Note: The statement above, prepared on a cash basis, includes dues received in advance, $6,947, and employees' withholding tax, $123.06. It does not reflect the following:

Accounts receivable, dues	$184.00
Due on account of advertising	71.25
	$255.25

No depreciation has been taken on furniture and fixtures.

STATEMENT OF CASH RECEIPTS AND DISBURSEMENTS (Exhibit B)

For the year ended August 31, 1957

General Fund

Receipts (exclusive of dues received in advance and employees' withholding tax)			
Initiation fees		$ 201.00	
Dues, 1956-1957 and prior years		3,553.00	
Interest		428.78	
From publication of Journal			
Advertisements	$5,624.25		
Subscriptions	836.26		
Sale of Journal	146.63		
Sale of plates	10.80	6,617.94	
Miscellaneous			
Membership certificates	$40.50		
Membership lists	7.50	48.00	
Total receipts			$10,848.72
Disbursements			
Publication of Journal			
Printing	$5,297.64		
Reprints	287.00		
Reporting	223.40		
Stationery and postage	242.92		
Editor's salary	750.00		
Sundry	41.24	$6,842.20	
General and administrative			
Salaries	$4,840.00		
Certificates of membership	21.25		
Printing, postage and stationery	250.98		
Office supplies and expense	35.50		
Office rent	1,260.00		
Electricity	90.77		
Telephone and telegraph	232.66		
Auditing	100.00		
Social security taxes	155.93		
Sundry	158.03	7,145.12	
Forward		$13,987.32	$10,848.72

Brought forward		$13,987.32	$10,848.72
Disbursements (continued)			
Meetings and committees			
Water works school	$ 125.00		
Printing, postage and stationery	1,328.19		
Convention expense	359.04		
Dinners	916.08		
Contribution to June conference	150.00		
Scholarship fund expenses	150.40		
Sundry	372.67	3,401.38	
Interest added to savings bank deposits		316.28	
Total disbursements			17,704.98
Excess of disbursements over receipts (exclusive of dues received in advance and employees' withholding tax for current year)			($6,856.26)
Dues received in advance		$6,947.00	
Employees' withholding tax			
Payment for prior year	$143.95		
Less Receipts for current year	123.06	20.89	6,926.11
Excess of receipts over disbursements, Exhibit A			$ 69.85
Balance, general cash, August 31, 1956			5,436.33
Balance, general cash, August 31, 1957			
Represented by			
Cash in First National Bank of Boston		$5,456.18	
Cash in office		50.00	
			$5,506.18

Scholarship Fund

Receipts		
Contributions	$6,303.60	
Interest	58.38	
Transfer from invested funds		
Sale of Braintree Co-operative Bank shares	1,000.00	
Balance, scholarship cash, August 31, 1957		
Represented by cash in Milton Co-operative Bank, Exhibit A		$7,361.98

ANNUAL REPORT OF THE EDITOR

To the New England Water Works Association:

The Editor submits herewith his report for the year ending August 31, 1957. The financial figures, tabulated in the report, are derived from the report of the Treasurer, which contains a detailed statement of the receipts and disbursements on account of the September and December, 1956, and March and June, 1957, issues of the JOURNAL.

In Table 1 is presented a statement of the material contained in the four issues of the JOURNAL for the past year, while in Table 2 is given a comparison of the JOURNAL for the past year with those for preceding years.

TABLE 1.—STATEMENT OF MATERIAL IN SEPTEMBER AND DECEMBER, 1956, AND MARCH AND JUNE, 1957, ISSUES OF THE JOURNAL OF THE NEW ENGLAND WATER WORKS ASSOCIATION

	Number of pages								
	Papers	Proceedings*	Total text	Index	Advertisements	Cover and contents	Insert plates	Total pages	Total cuts (number)
Sept., 1956	103	11	114	0	45	4	0	163	13
Dec., 1956	0	92	92	8	46	4	0	150	0
Mar., 1957	51	53	104	0	45	4	1	154	20
June, 1957	56	52	108	0	45	4	2	159	16
Total	210	208	418	8	181	16	3	626	49

*Including standard specifications.

Size. The four issues contained 626 pages, of which 418 were text.

Cost. The gross cost of the JOURNAL was $6,842.20, equivalent to $6.16 per member; the net cost was $224.26, equivalent to $.20 per member.

Reprints. Reprints of papers have been furnished to authors at cost.

TABLE 2.—COMPARISON OF JOURNALS OF THE NEW ENGLAND WATER WORKS ASSOCIATION
Four Issues for Fiscal Year Ending August 31

	1948[1]	1949[2]	1950[3]	1951[4]	1952[5]	1953[6]	1954[7]	1955[8]	1956[9]	1957[10]
Average edition (copies printed)	1,350	1,325	1,250	1,300	1,390	1,420	1,442	1,476	1,495	1,498
Average membership	876	905	921	957	1,017	1,057	1,077	1,089	1,106	1,110
Circulation at end of year	1,129	1,164	1,172	1,240	1,283	1,331	1,334	1,357	1,387	1,427
Pages of text	411	452	440	423	463	421	436	442	457	418
Pages of text per 1,000 members	469	500	477	442	456	398	405	406	413	376
Total pages, all kinds	615	661	666	703	671	635	652	655	674	626
Total pages per 1,000 members	702	731	723	734	660	601	606	602	610	564
Gross Cost:										
Total	$4,239.64	$5,016.44	$5,240.51	$6,069.62	$5,423.98	$5,865.67	$6,108.76	$5,898.97	$7,060.88	$6,842.20
Per copy	0.78	0.95	1.05	1.17	0.98	1.03	1.06	1.00	1.18	1.14
Per page	6.90	7.60	7.86	8.64	8.08	9.23	9.37	9.02	10.48	10.91
Per member	4.84	5.55	5.69	6.34	5.34	5.55	5.68	5.42	6.38	6.16
Per member per 1,000 pages	7.87	8.40	8.55	9.02	7.96	8.75	8.71	8.28	9.46	9.85
Per member per 1,000 pages of text	11.78	12.28	12.92	14.99	11.52	13.19	13.03	12.25	13.92	14.72
Surplus:										
Total	$1,990.81	$1,058.96	$1,294.73	$ 351.34	$1,040.76	$ 500.97	$ 513.89	$ 101.11	$ 588.09*	$ 224.26*
Per copy	0.37	0.20	0.26	0.07	0.19	0.09	0.09	0.02	0.10*	0.04*
Per page	3.32	1.60	1.94	0.50	1.55	0.79	0.79	0.15	0.87*	0.36*
Per member	2.28	1.17	1.41	0.37	1.02	0.47	0.48	0.09	0.53*	0.20*
Per member per 1,000 pages	3.71	1.77	2.12	0.53	1.52	0.74	0.73	0.14	0.79*	0.32*
Per member per 1,000 pages of text	5.55	2.59	3.20	0.88	2.20	1.12	1.10	0.20	1.16*	0.48*

1Including 54 pages of standard specifications.
2Including 107 pages of standard specifications and recommended practice.
3Including 25 pages of standard specifications.
4Including comprehensive index, 1882 to 1950.
5Including 16 pages of standard specifications.
6Including 87 pages of standard specifications and recommended practice.
7Including 71 pages of standard specifications and recommended practice.
8Including 8 pages of standard specifications.
9Including 27 pages of standard specifications.
10Including 47 pages of standard specifications.

*Net cost.

Circulation. The present circulation of the JOURNAL is:

Members, all grades	1,103
Subscribers	233
Exchanges	26
Advertisers	65
Total	1,427

JOURNALS have been sent to all subscribers and to advertisers.

Respectfully submitted,

(*Signed*) GEORGE C. HOUSER, *Editor*

REPORT OF MEMBERSHIP COMMITTEE

September 13, 1957

To the New England Water Works Association:

We regret to report that the total membership of the Association has dropped by 14 during the past year. The following figures give the membership for the past two years.

As of Sept. 1, 1956		*As of Sept. 1, 1957*	
Members	938	Members	923
Associates	143	Associates	144
Corporates	36	Corporates	36
	1,117		1,103

Loss of 14

1957

Losses:			*Elections:*	
Members:			Members	55
Resigned	34		Junior members	1
Died	22		Associates	8
Dropped	15	71	Corporates	1
				65
Associates:				
Resigned	6			
Dropped	1	7		
Corporates:				
Resigned	1	1		
		79		

As you know, there are two very active Water Works Associations in northern New England—one in New Hampshire and one in Maine—and the Committee finds it difficult to induce water-works officials in these northern states to join the New England Association at the present time.

It is suggested that a more active campaign for membership be carried on during the coming year. It has also been suggested that an invitation form be sent to all prospective members, such as was done two years ago, together with a follow-up letter explaining the benefits of the Association.

Respectfully submitted,

JOHN J. BAFFA
ROLAND F. BURKE
CLARENCE W. METCALF
EDWIN T. MCDOWELL
EDGAR P. SNOW
RICHARD S. WOODHULL
(*Signed*) GEORGE W. COFFIN, *Chairman*

ANNUAL REPORT OF THE FINANCE COMMITTEE

August 31, 1957

To the Executive Committee of the
New England Water Works Association:

The Finance Committee herewith submits its report on the budget for the year 1956-57, and its recommended budget for the year 1957-58.

The Committee has examined the figures obtained from the records of the Association during the past year and has consulted with the Treasurer concerning revenue and disbursements for the coming year.

The following tabulation is the estimated and the actual budget for the past year:

REVENUE FOR 1956-57

	Budget	Actual
Entrance fees	$ 200.00	$ 201.00
Dues	10,700.00	10,500.00
Interest	350.00	428.78
Advertising	5,600.00	5,624.25
Other Journal receipts	700.00	993.69
Miscellaneous	50.00	48.00
	$17,600.00	$17,795.72

DISBURSEMENTS FOR 1956-57

	Budget	Actual
General and Administrative	$ 7,800.00	$ 7,166.01
Journal	7,600.00	6,842.20
Meetings and Committees	2,600.00	2,334.90
Net expense of luncheons	1,000.00	916.08
Contingencies	800.00	150.40
	$19,800.00	
Transferred to Scholarship Fund	1,000.00	
	$20,800.00	$17,409.59

The deficit for the past year was estimated at $2,200, exclusive of the transfer of $1,000 to the Scholarship Fund, but the year closed with a surplus of $386.13, due largely to the prompt payment of dues and the fact that expenses were held to a minimum, despite rising costs in the operation of the Association.

The invested funds of the Association are $13,761.23.

The following budget is recommended for the year 1957-58:

REVENUE	
Entrance fees	$ 200.00
Dues	10,500.00
Interest	400.00
Advertising	5,600.00
Other Journal receipts	750.00
Miscellaneous	50.00
	$17,500.00
DISBURSEMENTS	
General and Administrative	$ 7,900.00
Journal	8,000.00
Meetings and Committees	3,100.00
Net expense of luncheons	1,000.00
Contingencies	500.00
	$20,500.00

We refer you to the Treasurer's report which includes the report of the Auditors, Scovell, Wellington & Co., for further financial details, and to the Secretary's report for changes in the membership listing.

Respectfully submitted,

GEORGE N. WATSON, *Chairman*
JAMES D. HALWARTZ
EDWIN M. HOWARD

ANNUAL REPORT OF THE SCHOLARSHIP COMMITTEE

To the New England Water Works Association:

The permanent Scholarship Committee, appointed by the President and Executive Committee in October, 1956, to carry out the New England Water Works Association Scholarship Program, adopted by the membership by ballot in May, 1956, solicited the membership by letter in January, April, and June and received contributions, including $58.38 in bank interest, of $7,486.98 through Sept. 16, 1957.

The Scholarship Program provides that:

(1) A permanent Scholarship Committee of seven members, including the Treasurer of the New England Water Works Association, be appointed before November 1 by the President and the Executive Committee, to solicit and accept donations and to administer the scholarship fund for the advancement of water-works practice through the members of the New England Water Works Association. Two members of the Scholarship Committee to be appointed for one year, two for two years and two for three years initially, and two members for three years thereafter. The Treasurer of the Association shall be a member of the Committee ex-officio. The Committee shall elect its own Chairman, Vice-chairman and Secretary. The Committee shall report annually at the Annual Convention of the Association.

(2) Members, associate members, corporate members or individuals, companies or associations be approached by the Scholarship Committee for contributions to a scholarship fund of Twenty-five Thousand Dollars or more. Income may be expended or loaned for scholarships when contributions amount to Ten Thousand Dollars. At no time shall disbursements from the fund reduce the fund to an amount less than the sum of the actual contributions. An initial contribution of One Thousand Dollars from invested funds is to be made by the New England Water Works Association and additional sums may be added by the Association at any time. The Scholarship Fund is to be deposited in such savings bank or other bank or invested in government or other bonds by the Treasurer as the Scholarship Committee

directs and approves. Disbursements from the Fund are to be made by the Treasurer as directed and approved by the Scholarship Committee.

(3) Scholarships be awarded by the Scholarship Committee on the basis of merit, character, and need to members and junior members of the New England Water Works Association, with preference given to applicants whose programs are considered by the Scholarship Committee as beneficial to water-works practice in New England. Loans may be made by the Scholarship Committee from the Scholarship Fund upon such terms and conditions as the Committee may decide.

(4) The Association provide annually sufficient funds for the Scholarship Committee for promoting and administering the Scholarship Fund. The Scholarship Committee is to have full authority to make such rules and regulations for the selection of candidates and the award of scholarship loans and grants as are not inconsistent with the general policy herein stated.

The Scholarship Committee thanks the following contributors for their support in reaching 75% of the initial Scholarship Fund goal and assuring that a scholarship loan or grant will eventually be made.

Respectfully submitted,

(*Signed*) WILLIAM B. DUFFY, *Chairman*
THOMAS R. CAMP, *Vice Chairman*
RICHARD M. CLEVELAND, *Secretary*
WILLIAM P. MELLEY, *Treasurer*
RICHARD M. BERRY
ROGER W. ESTY
KENNETH F. KNOWLTON

CONTRIBUTORS TO SCHOLARSHIP FUND THROUGH SEPT. 16, 1957

Aldrich, Ellwood H.
Ahlgren, Clarence L.
Arnold, Walter A.
Bengle, Victor N.
Blackmer, James W.
Bogren, George G.
Brown, Robert E.
Burke, Roland F.
Burlingame, Roland S.
Camp, Thomas R.
Carrington, Mayo
Chase, E. Sherman
Cianca, Oscar
Clark, Thomas W.
Classon, W. Guy
Cleveland, Richard M.
Cobb, Edwin B.
Colton, William R.
Coughlin, Thomas F.
Crabtree, Henry G.
Craven, Thomas T.
Dresser, Herman G.
Duffy, John H.
Duffy, William B.
Erickson, Ernest E.
Esty, Roger W.
Fay, Spofford & Thorndike
Flood, Frank L.
Fox, Benjamin E. (deceased)
Frank, J. A.
Fuller, Charles E.
Gavett, Weston
Gaynor, Lester
Gentner, Warren A.
Gifford, Allan T.
Graf, August V.
Griswold, Harold W.
Grossman, Richard P.
Haley, F. W.
Hodgdon, Clifton E.
Hughes, Henry F.
Jackson, Norman E.
Kennison, Karl R.
Killam, Elson T.
Knowlton, Kenneth F.
Knox, Joseph C.
Lamprey, Gerald H.
Lawler, Joseph C.
Manganaro, Charles A.
Mansfield, Myron G.
Marston, Frank A.
Matera, James J.
McCarthy, Joseph A.
McDonald, A. H.
Mebus, George B.
Melley, William P.
Moore, Edward W.
Mountain, Albert E.
Norrington, Walter L.
Oakman, Roger G.
O'Hanlon, Joseph
O'Reilly, John S.
Pazziani, Paul (Switzerland)
Root, Darrell A.
Sampson, George A.
Smith, Irving B.
Stearns, Whitney K.
Sullivan, William F.
Symonds, Allan M.
Thomas, Ariel A.
Tracy, Edward L.
Turnbull, Francis J.
Veatch, Nathan T.
Wheeler, Robert C.
White, Ralph H.
Wolfe, Thomas F.

Bristol, Conn., City of

Biddeford & Saco Water Co.
Bristol County Water Co.
Consumers Water Co.
Dedham Water Co.
Greenwich Water Co.
Grafton Water Co.
Hampton Water Co.
Hingham Water Co.
Mass. Water Works Co.

CONTRIBUTORS TO SCHOLARSHIP FUND (*continued*)

Milford Water Co.
Mystic Valley Water Co.
New Canaan Water Co.
Noroton Water Co.
Oxford Water Co.
Salisbury Water Supply Co.
Torrington Water Co.
Wannacomet Water Co.

American City Magazine
B-I-F (N. E. Sales office)
B-I-F (Providence)
Cement Lined Pipe Co.
Chapman Co., R. E.
Darling Valve & Mfg. Co.
Dresser Mfg. Div.
Eddy Valve Co.
Ford Meter Box Co., The
Foxboro Company, The
Hays Mfg. Co.
Hedge & Mattheis Co.
Hersey Mfg. Co.
Hydraulic Development Corp.
Industrial Chem. Sales Div.
Kennedy Valve Mfg. Co.
Layne-New York Co.
Lock Joint Pipe Co.
Moore & Co., Gil
Mueller Co.
National Water Main Clng. Co.
Neptune Meter Co.
Parsons Co., W. B.
Pitometer Co., The
Red Hed Mfg. Co.
Shahmoon Industries
Smith-Blair, Inc.
Smith Mfg. Co., The A. P.
Torrington Supply Co., Inc.
Wood Co., R. D.

10 Anonymous

New England Water Works Association

Barnhill, Kenneth G.
Capaldi, Edward F.
Clifford, John C.
Coffin, George W.
Cole, Daniel W.
Emerson, Frank
Fair, Gordon M.
Gage, Willard L.
Gay, George F.
Glidden, A. Leland
Howard, Edwin M.
Howard, Paul F.
Kennison, Karl R.
Miller, David W.
Minkus, Alexander J.
Naylor, William
Reed, Clarence H.
Shaw, Percy A.
Symons, George E.
Walker, Kenneth H.

Britt Co., M. C.
Caldwell Co., George A.
Foxboro Co. (2nd contrib.)
Glenfield & Kennedy, Inc.
Jenkins Bros.
Prescott & Sons, H. R.
Worthington-Gamon Meter Div.

Rockwell, Col. Willard F.

Immediate Scholarship Fund Goal	$10,000.00
Contributions to Nov. 22, 1957	7,611.98
Amt. needed to start scholarship loans or grants	$2,388.02

Please send contributions at once to:

New England Water Works Scholarship Fund
73 Tremont St.
Boston 8, Mass.

REPORT OF THE COMMITTEE ON COMMITTEES
1956-1957

To the New England Water Works Association:

The Committee on Committees, comprised of the members of the Executive Committee, has reviewed the activity of the technical committees for the past year and recommends that all committees be continued as follows:

N.E.W.W.A.

8 Committee on Legislation.
9 Committee on Reciprocal Relations with the Institution of Water Engineers (London).
11 Committee on Survey of Ground Water Supplies in New England.
12 Committee on Rainfall and Yield of Drainage Areas.
16 Committee on Coefficients for Friction in Pipe Lines.
19 Committee on Water Quality and Treatment.
21 Committee on Specifications for Cast-Iron Pipe and Fittings.
22 Committee on Reinforced Concrete Pressure Pipe.
23 Committee on Code for Pressure Piping.
24 Committee on Laying Cast-Iron Pipe.
25 Committee on Specifications for Steel Pipe.
26 Committee on Standardization of Pipe Flanges and Fittings.
28 Committee on Steel Standpipes and Elevated Tanks.
30 Committee on Meter Specifications.
37 Committee on Federal Activities.
38 Committee on Fluid Permeability.
39 Committee on Deep-Well Vertical Pumps.
42 Committee on Conservation, Development and Utilization of Water Resources.
44 Committee on Publicity.
45 Committee on Recreational Uses of Public Water Supplies.
46 Committee on Plastic Pipes and Plastic Linings for Water-Supply Uses.
47 Committee on Methods of Financing Water-Main Extensions.

The establishment of a committee to be known as N.E.W.W.A. 49, Committee on Water-Works Safety Practice, has been approved by the Executive Committee, the personnel to be appointed in October.

The work of the technical committees is vital to the welfare of the Association in keeping it informed of the trends and progress made in the water-works field.

The Committee on Committees wish to express their appreciation for the time and effort expended by the various technical committees. Suggestions relative to the creating of new committees or the work of existing committees are always welcome and should be sent to the Committee on Committees.

Respectfully submitted,

COMMITTEE ON COMMITTEES

ANNUAL REPORT OF THE COMMITTEE ON LEGISLATION

September 16, 1957

To the New England Water Works Association:

Your Legislative Committee submits herewith its report on activities in the legislatures of the New England States during the year 1957. Sessions were held in all six states, and your committee member from each has filed informative material which has been incorporated into this report.

The following is a resumé of the three more important legislative matters, from a water-supply standpoint, which were up for consideration at the 1956-7 session of the *Connecticut* General Assembly.

1). Reimbursement for Relocation of Utility Structures Necessitated by State Highway Construction.

The bill which was passed at the 1955 session, which provided that the cost of relocating utility structures in a trunkline highway be equitably shared by the State Highway Department and the utility, was repealed.

The substitute bill was passed at the 1956-7 session, which extended the reimbursement coverage to include any highway which it is the duty of the State Highway Department to maintain, and further defined the equitable share of the cost of utility relocation to be borne by the State Highway Department as follows:

(a) In the case of a limited access highway the state's equitable share is defined as the entire cost less a sum based on a consideration of the value of materials salvaged, the cost of the original installation, the life expectancy of the original facility, and the unexpired term of such life use.

(b) In the case of all other highways maintained by the state the state's share of the cost of relocation is defined as such portion or all of the entire cost adjusted as for limited access highways, but in no event to be less than 50% of the cost after such adjustment.

The bill further provides that in case of disagreement as to the share to be borne by the state, either side may appeal to the Superior Court for hearing by a referee appointed by the court.

2). Opening Water-Supply Reservoirs to Fishing and Other Recreational Uses.

The perennial bill for opening up water-supply reservoirs to fishing and other recreational uses was again considered at the 1956-7 session.

This year's bill would have opened up public water-supply watersheds, private and municipal, to fishing, hunting, boating, parking, or other recreational

uses, under supervision of a committee of six members, two each from the State Department of Health, the State Board of Fisheries and Game, and the Park and Forest Commission. The Act would have empowered the Commission to provide for the development and use of such lands for such recreational uses, to make proper regulations, and to collect reasonable fees therefor.

The bill met with concerted opposition of Connecticut water utilities, through the Connecticut Water Works Association, and failed of passage. The subject matter has, however, been referred to the Legislative Counsel for study during the next two years, and something of this nature will doubtless appear in the 1958-59 session of the General Assembly.

3). CREATION OF WATER RESOURCES COMMISSION.

The purpose of this Act was to consolidate into one department all of the functions of the State Water Commission, the State Flood Control and Water Policy Commission, and the State Board for the Supervision of Dams, so as to facilitate the administration of the complex problems dealing with abatement of pollution, flood control, shore erosion, water policy, and problems involving the construction of dams and reservoirs.

The Commission is made up of seven members appointed by the Governor for terms of four years each, each member being a representative of one of the following interests: agriculture; public health; fish, wildlife and recreation; industries; public utilities; municipalities, and interests at large.

Legislative activity in *Maine* produced the following:

CHAPTER 269.—"An Act Relating to Systems of Water Supply. This enactment delineates the functions, responsibilities, duties and authority of the Department of Health and Welfare in relation to the water supplies of the state."

CHAPTER 295.—"An Act Relating to Authority of Public Utilities Commission over Construction of Water Supply Systems: A new version of Sec. 13 of Chapter 44 which was repealed, provides that the Commission approve construction costs of water systems, method of financing, whether a new system is being constructed or a major addition or alteration is planned."

CHAPTER 303.—"An Act Relating to Fluoridation of Public Water Supplies. This enactment stipulates the conditions to which a public utility must conform previous to fluoridation and subsequent to approval by the consumers."

CHAPTER 378.—"An Act Relating to Cost of Relocating Facilities in Federal-Aid Interstate Highway Projects."

Sec. 1. R. S., C23, 23-A, Additional. Chapter 23 of the Revised Statutes is hereby amended by adding thereto a new Section, to be numbered 23-A, to read as follows:

Sec. 23-A. Payment for cost of relocating facilities in interstate system. Any utility which is required to move or relocate its facilities under the provisions of this Section from or in any way because of construction needs in build-

ing the interstate system under the Federal-Aid Highway Act of 1956 on projects for which the contracts are signed after the effective date of this Act shall be reimbursed for the cost of relocation of such facilities as said cost is defined in said Federal-Aid Highway Act. The State Highway Commission may make rules and regulations for the determination of such cost in conformity with applicable federal rules and regulations under said Act. The Commission shall have such rights to inspect the books of account of the utility as may be required in determining the reimbursable costs provided in this Section.

The Act goes into other detail, but we suggest that interested parties obtain a copy.

CHAPTER 400.—"An Act Relating to Facilities Furnished by Public Utilities for Rate Fixing Purposes. This enactment requires public utilities to supply adequate facilities and establish their charges on a reasonable, fair and just basis."

Several bills of purely local significance were passed into law.

On the date of the compiling of this report, the *Massachusetts* General Court was still in session; therefore, the following information must be considered a report of progress. Certain enactments were unavailable in printed form at the Secretary of State's office. Accordingly we are able at this time to report chapter number and title only.

The following measures have been passed into law:

CHAPTER 220.—"An Act Relative to the Authority of Water Companies to Discontinue or Shut Off or to Refuse to Furnish Water Service."

This is an amendment of Chapter 165 of the General Laws, permitting a water company under specified procedure to shut off water supply to the premises of any customer failing or refusing to pay the lawful charges of said company for water previously consumed. Sections 11B and 11C define situations in which a water company may not discontinue or refuse to supply water.

CHAPTER 224.—"An Act Extending the Period for Which Cities and Towns May Borrow Outside the Debt Limit for the Purchase of Water Meters."

This Act provides for the financing of the purchasing of water meters on a bond issue having a life of ten years.

CHAPTER 314.—"An Act Authorizing the Water Resources Commission to Investigate the Ground Water Resources in the Counties of Plymouth and Bristol" provides for a continuance of studies in the stated counties originally undertaken by a special commission established in 1954. Unexpended funds, authorized by prior appropriation, plus additional sums, when and if appropriated, may be expended by the Water Resources Commission for the purposes of this investigation.

CHAPTER 552 is entitled "An Act Permitting the Sale, Rental or Use of Certain Lands No Longer Needed for Public Water Supply Purposes, and the Granting of Certain Easements or Rights over Land So Held." This measure is based on an amended version of Senate Bill 665, Appendix "A."

Senate 665 originated as a special report of the Dept. of Public Health relative to the preservation of the purity of certain water supplies within the Commonwealth. The approved enactment is one of those not yet in print for public distribution. Appendix "B" of Senate 665, "An Act Relative to Payment in Lieu of Tax on Property Held for Water Supply Purposes," failed of passage.

CHAPTER 616 is "An Act Authorizing the Commonwealth to Enter into a Compact with the State of Connecticut Relative to Flood Control and Water Resources Utilization in the Basin of the Thames River and Its Tributaries."

Based on Senate 707 and unavailable in enacted form, your Committee reports 616 for whatever significance it may prove to have for public water supplies or water companies in the subject areas.

CHAPTER 678.—"An Act Authorizing the Department of Public Health to Establish a Sanitary Code" is legislation of broad scope respecting the powers and duties of the subject department. In the body of the bill, among other stipulations, there appears "It (DPH) shall have oversight of inland waters, including surface and sub-surface waters, and sources of water supply, and shall control the pollution or contamination of any or all of the lakes, ponds, streams, tidal waters and flats within the Commonwealth and the tributaries of such tidal waters and flats. . . . . It shall establish and may amend from time to time, after due notice and a public hearing, a sanitary code which shall become effective and have the force of law upon filing with the Secretary of State, or at such later date as may be specified by the department."

Your committee wishes to call particular attention to Senate 695, entitled "Report of the Legislative Research Council Relative to Rights to Surface and Sub-surface Water in Massachusetts." This report was accepted by the General Court on May 29th of this year and is an excellent, comprehensive and lengthy treatise, which may be recommended as a reference study for water-supply problems in the Commonwealth.

Several Resolves, having some bearing on water-supply matters, were approved during the session.

CHAPTERS 39 AND 112 revive, continue and increase the scope of the special commission established to investigate and study the feasibility of establishing a Southeastern Mass. Water District. CHAPTERS 45, 53 AND 57 revive, continue and increase the scope of the special commission established to make an investigation and study relative to the systems of sewerage and sewage disposal in the

North and South Metropolitan Sewer Districts and the city of Boston, and the water systems in said districts.

Several other measures of purely local interest were passed into law.

All bills relating to fluoridation of water were referred to the next annual session.

In *New Hampshire* very little in the way of water-supply legislation was considered during the 1957 session. There was one bill to reimburse utilities for relocation costs involved as a result of the expanded highway program made possible by the availability of federal funds. There was a considerable amount of controversy concerning it, and it met with opposition from the administration and the highway department. As a result it did not pass and died in committee.

The only other proposal that would be of interest involves borrowing by water-works departments. Heretofore the law was not entirely clear. The Municipal Finance Act would appear to allow unlimited borrowing by municipal water-works departments, but the chapter dealing with the acquisition and operation of lighting and water systems imposed a limitation of 10% of the valuation within the municipality for borrowing.

The new law retains the 10% feature but permits any municipality having received orders from the state board of health to incur debt beyond this limitation. Also there is a provision to allow a municipality which is not under order by the state board of health to apply to the Governor and Council through the state tax commission for authority to exceed the 10% limitation.

No legislation having any bearing on water-works matters was passed during the 1957 session of the General Assembly of *Rhode Island*.

The General Assembly of the state of *Vermont* enacted legislation amending an existing statute, allowing the Water Conservation Board to accept and acquire in the name of the state by purchase property rights in the waters of the state and the facilities or improvements therein, for the purpose of encouraging recreational uses of such waters. The original law authorized the board to accept the property by gift or donation.

This legislation did not alter the portion of the existing law which states that the authority of the Water Conservation Board shall not infringe upon the powers and duties of the State Board of Health and of local officials in respect to matters of public health.

Respectfully submitted,

(*Signed*) MARK F. CROKER, *Chairman*
JOHN W. COSTIGAN
WARREN A. GENTNER
WILLIAM A. HEALY
PHILIP J. HOLTON, JR.
EDWIN T. MCDOWELL
JOHN V. RICHARDS

REPORT OF COMMITTEE ON RECIPROCAL RELATIONS WITH INSTITUTION OF WATER ENGINEERS (LONDON)

October 18, 1957

To the New England Water Works Association:

Your committee will receive during the coming year a list of papers published in the Journal of the Institution of Water Engineers, which will be considered for the Reciprocal Diploma of Merit awarded by the New England Water Works Association.

It is expected that the list will be received and a selection made in time for the diploma to be presented in person by your committee's chairman at the Summer Meeting of the Institution in Birmingham next year.

We call your attention to the sudden death in December, 1956, of Mr. H. J. F. Gourley, who was largely responsible for the establishment of the Reciprocal Diploma of Merit. Mr. Gourley was an outstanding engineer of London, whose accomplishments had been recognized about one month before his death by his election to the presidency of the Institution of Civil Engineers. Your committee records his death with profound regret.

Respectfully submitted,

DONALD C. CALDERWOOD
PERCY A. SHAW
(*Signed*) E. SHERMAN CHASE, *Chairman*

REPORT OF COMMITTEE ON SPECIFICATIONS FOR CAST-IRON PIPE AND FITTINGS

September 1, 1957

To the New England Water Works Association:

As your representative on Committee A-21 of the American Standards Association on Specifications for Cast-Iron Pipe and Fittings (NEWWA Committee 21), I wish to report that during the year which has ensued since my last report, the Committee has completed and submitted to the sponsor societies a "Proposed Revision —American Recommended Practice—Manual for the Computation of Strength and Thickness of Cast Iron Pipe." This is the Manual designated ASA A-21.1-1956, which is referred to on page 164 of the June, 1957, issue of the Journal of NEWWA, notifying readers that the Executive Committee has approved this document, and pointing out that copies of the 171-page Manual are available for reference at the office of the Association.

The principal difference between the new Manual and that first issued in 1939 lies in the inclusion of additional matter relating to loads from embankments and tables of thickness for centrifugally cast pipe. The thickness tables in the 1939 edition were for pit-cast pipe only.

Respectfully submitted,

ARTHUR L. SHAW

REPORT OF COMMITTEE ON LAYING CAST-IRON PIPE

September, 1957

To the Members of the New England Water Works Association:

In its 1956 report your Committee on Laying Cast-Iron Pipe recommended the publication of the A.W.W.A. document, "Tentative Standard Specifications for Installation of Cast-Iron Water Mains," designation C600-54T, so that the members of this Association might consider the adoption of these specifications.

The document was published in the June, 1957, New England Water Works JOURNAL. Your Committee recommends that the specifications be adopted.

Although the work of the Committee is completed for the time being, we believe that it would be advisable to continue the Committee on an inactive basis, pending the final adoption of the specifications as standard.

Respectfully submitted,

(*Signed*) W. SEWARD MARINER, *Chairman*
GEORGE W. COFFIN

REPORT OF COMMITTEE ON STANDARDIZATION OF PIPE FLANGES AND FITTINGS

September 1, 1957

To the New England Water Works Association:

Committee B-16 (Standardization of Pipe Flanges and Fittings) of the American Standards Association has covered the following ground in the year since the last report of your undersigned representatives on this committee:

Review and reaffirmation, with certain editorial changes, of:

ASA B-16.3-1951 relating to 150-lb. Malleable Screwed Fittings.
ASA B-16.19-1951 relating to 300-lb. Malleable Screwed Fittings.

Tentative revision of:

ASA B-16.5 for Steel Pipe Flanges and Pipe Fittings.
ASA B-16.9 for Steel Butt-Welding Fittings.
ASA B-16.15 for 125-lb. Brass or Bronze Screwed Fittings.
ASA B-16.25 for Butt-Welding Ends.

Preparation of a tentative draft of a specification for Brass Fittings for Flared Copper Tubes (no number yet designated).

Most water-works men will have little or no direct interest in these matters, but it is advantageous to know that work is developing along these lines.

Respectfully submitted,

(*Signed*) J. PORTER HENNINGS
ARTHUR L. SHAW

REPORT OF THE COMMITTEE ON FEDERAL ACTIVITIES

September 16, 1957

To the New England Water Works Association:

There was no new Federal legislation of special interest to water utilities enacted during the current session of Congress. A number of bills were introduced on subjects such as water-resources coordination, federal subsidy for water development, federal loans for water departments, etc., but no action was taken on them.

The outstanding Federal activity of interest to the water-works profession continues to be that of the Water and Sewerage Industry and Utilities Division (WSIU) of the Business and Defense Services Administration (BDSA), U. S. Dept. of Commerce. When the National Production Authority (NPA) was abolished in 1953, BDSA was established with 25 industry divisions, of which the WSIU Div. is one of the most important. Each division is headed by a director from industry, who serves for 6 months to a year without compensation from the government. Members of N.E.W.W.A. who have served as director of the WSIU Div. since its organization are: Harvey S. Howe, Lock Joint Pipe Co.; James C. Crenshaw, American Water Works Service Co., Inc.; Thomas T. Quigley, Wallace and Tiernan, Inc.; Henry W. Hitzrot, Dorr-Oliver, Inc.; Charles W. Krause, Neptune Meter Co.; Harry F. Bower, James B. Clow & Sons; Louis F. Frazza, Johns-Manville Sales Corp., and Richard V. Ford, The Ford Meter Box Co.

The WSIU Div. is engaged in continuous studies of all phases of the water and sewerage fields, in collecting all basic information and obtaining new data which are compiled for industry in usable form. It is the authentic source of information on the water-supply and sewerage needs of the Nation and its requirements for materials and equipment for construction, expansion, maintenance and operation. Included in its many vital activities are: the training of water- and sewage-works personnel for emergency duty in event of mobili-

zation; cooperation with the Office of Defense Mobilization (ODM) in continuous programming for adequate mobilization and production for any all-out emergency, and the establishment of Stand-by Control Orders for material allotment and priorities for equipment for water- and sewage-works construction and maintenance in the event of war.

Respectfully submitted,

(*Signed*) JOSEPH C. KNOX

REPORT OF THE COMMITTEE ON CONSERVATION, DEVELOPMENT AND UTILIZATION OF WATER RESOURCES

September 16, 1957

To the New England Water Works Association:

Prompted in a large measure by the increasing concern being displayed throughout the Nation as to the adequacy of our water resources, the New England Water Works Association in 1951 established the Committee on Conservation, Development and Utilization of Water Resources for the express purpose of keeping the Association informed of current developments in water-resource matters. At that time the establishment of a national water policy was being strongly advocated by various associations and groups concerned with water resources. Statements of many of these groups setting forth their concept of such a policy were being widely circulated and several were ultimately adopted.

In 1954 President Eisenhower established the President's Advisory Committee on Water Resources Policy as the first step in formulating the Administration's water-resources program. The report of the President's Committee, proposing a long-range program for the conservation and use of the Nation's water resources, was submitted to Congress by the President in 1956. The major proposals in the report were presented at the 1956 NEWWA Convention by your committee. It was anticipated that the report of the President's Committee would serve as the basis for legislative action by the 85th Congress. However, the report is still in the Bureau of the Budget, to which it was sent by the President for review and recommendations. The pressure for adoption of a national water policy continues from many sources, and during the past year a statement of policy was prepared by the American Water Works Association Committee on National Water Policy.

A recent development attributable to the report of the Presi-

dent's Advisory Committee on Water Resources Policy was the organization of a President's Committee on Water Rights and Use, to study the relationship between the establishment of property rights to water and the economic and social development of the country. The Committee will also consider the principles which should be incorporated into law establishing the right to appropriate and use water—principles which would assure the most effective use and control of water in order to meet current and long-range needs. An interim report of the Committee will be submitted to the President by January 1, 1958, and a final report prepared by October 31, 1958.

Previous reference has been made to the $5 million survey report on New England's water resources, prepared by the New England-New York Inter-Agency Committee (NENYIAC) and forwarded to President Eisenhower in 1956. The 85th Congress, prompted by many requests for the report, enacted a resolution authorizing the printing of 3,000 copies of an abbreviated edition of the report as Senate Document No. 14. On the basis of the effectiveness of NENYIAC in studying regional problems, the New England Governors' Conference recommended that the New England States participate in a Federal-State regional water-resources council or committee. This recommendation resulted in the establishment last spring of the Northeastern Resources Committee, which is composed of representatives of the States and the Federal Government on a co-equal basis.

In the New England area our water resources continue to be of considerable public concern. On the State level, the 1957 Connecticut Legislature established a Water Resources Commission, which will administer the duties and functions previously performed by several agencies. The Rhode Island Legislature and the Massachusetts General Court have also established water-resources commissions to coordinate the water-resource activities of various State departments. On the regional level, the New England Council organized the New England Council Water Resources Committee. The Council recently adopted a policy statement prepared by the Committee, emphasizing the need for flood and pollution control, and the organization of river-basin associations. The statement further favored the employment of interstate compacts as a means of handling interstate water-

resource problems and pledged the Council's support to the New England Interstate Water Pollution Control Commission and the Connecticut and Merrimack Flood Control Commissions in their programs.

On the Federal level, several bills were introduced into the 85th Congress relating to the development and conservation of water resources through flood and pollution control. At the Annual Convention of the National Rivers and Harbors Congress in Washington there was created a new Committee on Industrial Water Use, Pollution Abatement, Wildlife and Recreation. In its report the Committee strongly urged a positive Federal-State-local cooperative program for maximum conservation of waters for essential use, including effective abatement of pollution.

Public Law 660 of the 84th Congress, which authorizes Federal grants for the construction of municipal sewage-treatment plants, appears to be a stimulus in providing cleaner waters in New England. Under the program of the New England Interstate Water Pollution Control Commission and its member States many communities are proceeding with the installation of treatment facilities, in order to meet the water-quality classifications established for various inland and tidal waters. In this connection two of the New England States, Maine and Vermont, recently enacted legislation providing for State grants-in-aid of 20% for sewage-treatment plant construction. Municipalities in these States may thus receive through Federal and State grants up to 50% of the cost of sewage-treatment works.

The many activities concerned with water resources on the various levels will be reported to the Executive Committee from time to time, in order that the Association may take any action deemed necessary or desirable.

Respectfully submitted,

(*Signed*) HARRY MANSON, *Chairman*
JOSEPH C. KNOX
WALTER J. SHEA

ANNUAL REPORT OF COMMITTEE ON PUBLICITY AND PUBLIC RELATIONS, 1956-1957

July 31, 1957

To the New England Water Works Association:

Your committee on publicity and public relations met on several occasions during the past year and discussed a number of items, and also asked that one of the Boston meetings be devoted to this subject. The March, 1957, meeting was devoted almost entirely to publicity and public relations, as a result of this request.

Some of the items discussed during the meetings are listed as follows:

1. The use of television to call the public's attention to certain features concerning the operation of a water supply. This has been done two or three times in Connecticut, once when a reservoir was shown which was badly depleted, and again when a civil defense pump was recently placed in use on an emergency brook supply for one of the municipal supplies.
2. Lead stories are very effective in publicity work, and the recent extended dry period has provided considerable means for directing the attention of the public to water utilities in general.
3. Occasionally newspapers write feature articles on various subjects, and a good feature article would be the source of the local water supply or perhaps the treatment, or both. Discussions have stressed the need of knowing the style desired by the local paper, and once the style is known, it can be followed and newspaper publicity would come that much easier.
4. Some of the larger companies edit their own local papers, and this is helpful so far as public relations are concerned.
5. Pamphlets can be printed by a local water utility, in some cases showing the history of the water utility, and especially during an anniversary, such publicity can be enlarged through the use of local printed material.
6. Good public relations can be obtained by proper relations with the school system. Visits by various school classes or lectures can be arranged, whereby local scholars can be informed of their water supply.
7. A somewhat more ambitious program might possibly be entertained by the New England Water Works Association publicity committee through the publication of a manual on publicity.

While the subjects listed above were discussed, nothing of a very

concrete nature has been established, but it is thought that a committee on public relations and publicity should be continued as a standing committee of the New England Water Works Association for the coming year.

Sincerely,

(*Signed*) FREDERICK O. A. ALMQUIST, *Chairman*
RICHARD N. BERRY
CLARENCE E. FERRY
CHARLES B. HARDY
JAMES J. MATERA
WILLIAM H. MCGUINNESS
GLEN S. WEEKS
WILLIAM A. D. WURTS

PROGRESS REPORT OF COMMITTEE ON PLASTIC PIPES AND PLASTIC LININGS FOR WATER-SUPPLY USES

Sept. 1, 1957

To the New England Water Works Association:

During the past year a fairly extensive installation of several varieties of plastic pipe has been made in the plumbing laboratory of the Lawrence Experiment Station. The installation includes not only two different pipe thicknesses of plastic pipe but also practically all the fittings, such as reducers, sleeve joints and standard fittings like elbows, tees and unions, and also several valves which are partially or wholly composed of one or more plastic substances. This gridwork of pipes is connected to the city water pressure, a pump line, a vacuum line and a measuring system with a series of rotometers of several different capacities.

In addition, sections of pipe and fittings have been connected into the settled sewage system of the station, and other specimens are kept completely or partially immersed in a sewage sump or suspended in the atmosphere over this sump. Other specimens have been placed in a control box, where they are intermittently wetted by a flow of domestic sewage. All of these specimens have been previously examined and weighed and will be ready for examination at the end of several periods of time.

Through the joint efforts of the General Tire Corp. of Lawrence and the Lawrence Experiment Station, an instruction course on methods of connecting and installing plastic pipe, covering six weeks, was also operated during the past year.

Respectfully submitted,

(*Signed*) JOSEPH A. MCCARTHY, *Chairman*
CHARLES B. HARDY
JOHN P. LYNCH
I. LAIRD NEWELL

COMMITTEES OF THE NEW ENGLAND WATER WORKS ASSOCIATION

1957-1958

N.E.W.W.A.

1. *Committee on Technical Programs:* Paul F. Howard, *Chairman,* John C. Adams, Jr., G. Arthur Faneuf, Albert S. Genaske, Clifton E. Hodgdon, George C. Houser, James J. Matera, Alexander J. Minkus, William H. McGuinness, I. Laird Newell, Harold B. Scales and Ralph M. Soule.
2. *Committee on Northern New England Meeting.*
3. *Committee on Southern New England Meeting.*
4. *Committee on Finance:* James D. Halwartz, *Chairman,* Edwin M. Howard and James W. Reilly.
5. *Committee on Membership:* George W. Coffin, *Chairman,* John J. Baffa, Donald C. Calderwood, Edwin T. McDowell, Francis J. O'Brien, Edgar P. Snow and Richard S. Woodhull.
6. *Committee on Library:* Sydney C. Beane, *Chairman,* and Francis J. Turnbull.
7. *Committee on Committees:* George G. Bogren, *Chairman,* Clarence L. Ahlgren, Warren A. Gentner, Peter C. Karalekas, Allan F. McAlary, William P. Melley, Kenneth W. Robie, Walter J. Shea and Edward L. Tracy.
8. *Committee on Legislation:* Mark F. Croker, *Chairman,* Warren A. Gentner, William A. Healy, John W. Costigan, Philip J. Holton, Jr., Edwin T. McDowell and John V. Richards.
9. *Committee on Reciprocal Relations with the Institution of Water Engineers* (England): E. Sherman Chase, *Chairman,* Donald C. Calderwood and Percy A. Shaw.
11. *Committee on Survey of Ground-Water Supplies in New England:* Francis J. Lariviere, *Chairman,* M. L. Brashears, Jr., John C. Clifford, O. Milton Hackett, Richard F. Mason, John V. Richards, Ralph M. Soule, Hyman J. Steinhurst and Richard S. Woodhull.
12. *Committee on Rainfall and Yield of Drainage Areas:* Francis H. Kingsbury, *Chairman,* Peter C. Karalekas, Karl R. Kennison, Charles E. Knox, Francis J. Lariviere, Ralph M. Soule, Hyman J. Steinhurst, Harold J. Toole, Howard M. Turner and William A. D. Wurts.

16. *Committee on Coefficients for Friction in Pipe Lines:* Richard H. Ellis, *Chairman,* John C. Adams, Jr., E. Shaw Cole, F. W. Haley, William D. Monie, Sherman L. Rogers, William E. Stanley and Lee Marc Wolman.

19. *Committee on Water Quality and Treatment:* Edward W. Moore, *Chairman,* George G. Bogren, Edward S. Brown, Jr., Clair N. Sawyer, Warren J. Scott and David H. Turcotte.

21. *Committee on Specifications for Cast-Iron Pipe and Fittings* (Sectional Committee under American Standards Association): Arthur L. Shaw.

22. *Committee on Reinforced-Concrete Pressure Pipe* (Joint with American Water Works Association): Stanley M. Dore, *Chairman,* George W. Coffin and Herman G. Dresser.

23. *Committee on Code for Pressure Piping* (Joint with American Society of Mechanical Engineers): Thomas F. Wolfe.

24. *Committee on Laying Cast-Iron Pipe* (Joint with American Water Works Association): W. Seward Mariner, *Chairman,* and George W. Coffin.

25. *Committee on Specifications for Steel Pipe* (Joint with American Water Works Association): Chester J. Ginder, *Chairman,* and Charles B. Hardy.

26. *Committee on Standardization of Pipe Flanges and Fittings* (Sectional Committee under American Standards Association): Arthur L. Shaw and J. Porter Hennings.

28. *Committee on Steel Standpipes and Elevated Tanks* (Joint with American Water Works Association): George A. Sampson, *Chairman,* Francis E. Blaney, Herman Burgi, Jr., and Joseph C. Lawler, Jr.

30. *Committee on Meter Specifications* (Joint with American Water Works Association): Reeves Newsom, *Chairman,* Frank S. Brainard and Richard H. Ellis.

37. *Committee on Federal Activities* (Joint with American Water Works Association): Joseph C. Knox.

38. *Committee on Fluid Permeability* (Sectional Committee under American Standards Association): Stanley M. Dore.

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MEMOIR OF LINN H. ENSLOW

Linn H. Enslow, a member of the New England Water Works Association since 1931, died at his farm in Dublin, Va., on Nov. 3, 1957. Mr. Enslow, who was born in Richmond, Va., on Feb. 26, 1891, was educated at Virginia Polytechnic Institute and Johns Hopkins University. He had been Editor of *Water & Sewage Works* since 1931 and was well known in the field of water supply and sewage disposal.

Among the many honors he received for his devoted service to his profession was Honorary Membership in the American Water Works Association, of which he was a past-president as well as a recipient of that association's Diven Medal, Goodell Prize and George W. Fuller award. He had also served the American Water Works Association in many committee capacities, in addition to being a director and long-time chairman of the program committee.

Mr. Enslow was also an Honorary Member of the British Institute of Sewage Purification and a Fellow of the American Public Health Association. He was active in the New York Sewage and Industrial Wastes Association, of which he was a past-president; the American Society of Civil Engineers, of which he was a past-chairman of the Sanitary Engineering Division; and the Water & Sewage Works Manufacturers Association, of which he was a past-chairman of the Executive Committee. He was active in the Federation of Sewage and Industral Wastes Associations, in which he had served a term as vice-president, director and Chairman of Publicity. He was also a member of the American Institute of Chemical Engineers and a number of local water and sewage associations.

Before joining the editorial staff of *Water & Sewage Works*, Mr. Enslow had been research and development engineer of the Chlorine Institute, and he was widely known for his articles on chlorination, as well as for the development of a chlorine comparator and the "Enslow Stability Indicator."

Mr. Enslow's early experience included that as chemist in charge

of water filter plants in Spartanburg, S. C., and the Panama Canal Zone, and as a Sanitary Engineer with both the Maryland and Virginia Health Departments. He was the co-developer with Dr. Abel Wolman of the orthotolidine test for water-chlorination control. During World War I he served with the First Maryland Cavalry in the U. S. Army, and during World War II he was a special consultant to the War Production Board.

Mr. Enslow resided in Jackson Heights, N. Y. He is survived by his widow, Mary Elva Glendy Enslow, a son, Harrison, and a daughter, Mrs. Lawton Spencer.

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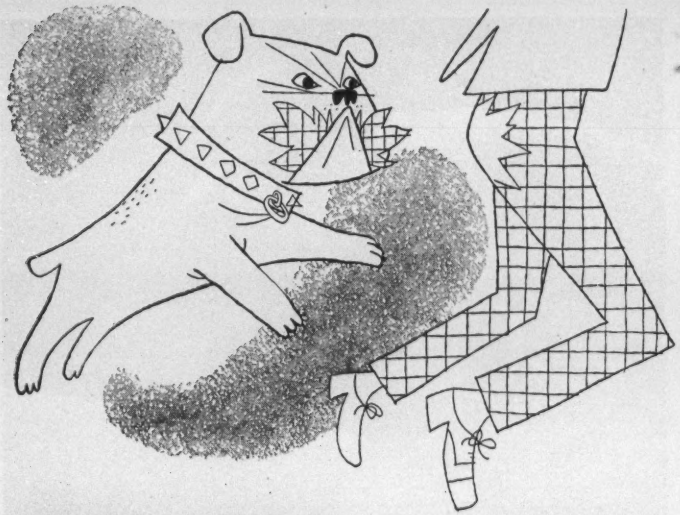

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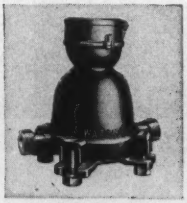

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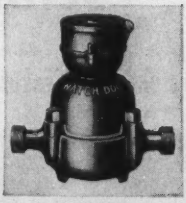

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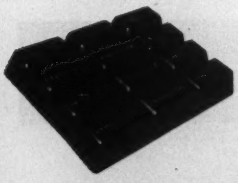

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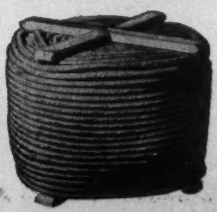

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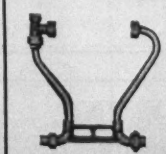

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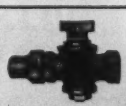

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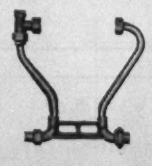

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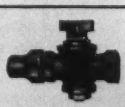

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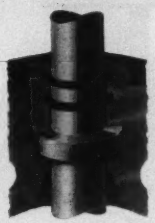
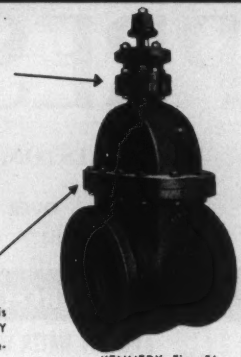


O-RING SEALS

Provide excellent seal, prevent binding of stem and result in very easy valve operation. KENNEDY O-Rings are located above collar, permit repacking under pressure. Optional on KENNEDY non-rising stem A.W.W.A. valves.



KENNEDY Fig. 56
A.W.W.A. Standard Iron-Body Double-Disc Gate Valve, with Bell Ends.

STRONGER CONSTRUCTION

Rugged design and construction features iron that is 50% stronger than ordinary cast iron to keep KENNEDY Valves doing a better job over a longer, more dependable operating life.

KENNEDY manufactures a complete line of water works valves. Sizes range from 2" to 48" including non-rising stem and outside-screw-and-yoke valves. These valves feature the hook-and-wedge type disc mechanism for easier, better and more positive valve operation. A wide variety of pipe connections are available.

For maximum service life, for the greatest value for your valve dollar, specify KENNEDY valves and fire hydrants. Remember, KENNEDY means dependability in valves, fire hydrants and accessories.

Fig. 571

Fig. 561

Fig. 566

Fig. 566G

Fig. 566FTR

Write today for NEW A.W.W.A. Valve Bulletin

UTILITIES SUPPLY CORPORATION
425 Riverside Ave. • Medford 55, Mass. • TEL. MYSTIC 8-9023

FOR WATER WORKS MATERIAL, CALL

PRESCOTT

WEST BOYLSTON, MASS. — TEmple 5-4431

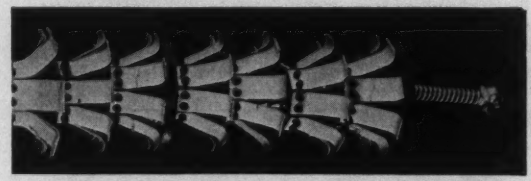
OVER 40 YEARS OF
DEPENDABILITY — QUALITY — SERVICE

H. R. PRESCOTT & SONS, INC.

QUALITY WATER WORKS SUPPLIES SINCE 1914

BOX 7 — GREENDALE BRANCH — WORCESTER 6, MASS.

50 YEARS IN 50 MINUTES



FLEXIBLE'S PATENTED PRESSURE TOOL with its two counter rotating heads, saw tooth head and cutting and scraping heads removes in minutes the accumulation of years.

NEW ENGLAND PIPE CLEANING CO. has been doing those "impossible" jobs day and night throughout the New England States. Operating under all conditions with experienced engineers having over twenty years of "know how," NEW ENGLAND PIPE CLEANING CO. has been saving money for far sighted water departments.

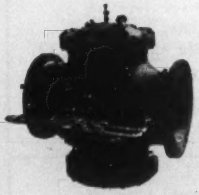
Also, a complete sewer cleaning service is available.

NEW ENGLAND PIPE CLEANING CO.

140 Rock View Dr., Cheshire, Conn. 41 Greenway St., Hamden, Conn.

1879—ROSS—1879

AUTOMATIC VALVES



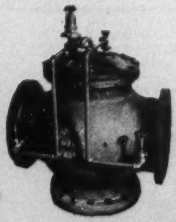
Controls elevation of water in tanks, basins and reservoirs

ALTITUDE VALVE
1. Single Acting
2. Double Acting

Maintains desired discharge regardless of change in rate of flow pressure

REDUCING VALVE

Regulates pressures in gravity and pump systems; between reservoirs and zones of different pressures, etc.



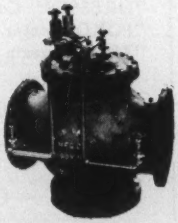
Maintains levels in tank, reservoir or basin

1. As direct acting.

2. Pilot operated and with float traveling between two stops, for upper and lower limit of water elevation.

FLOAT VALVE

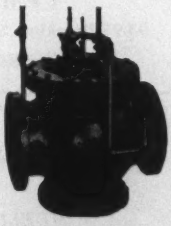
A self contained unit, with controls three or more automatic



COMBINATION VALVE

Combination automatic control both directions through the valve.

Maintains safe operating pressures for conduits, distribution and pump discharge



SURGE-RELIEF VALVE

Electric remote control—solenoid or motor can be furnished

REMOTE CONTROL VALVE

Adapted for use as primary or secondary control on any of the hydraulically controlled or operated valves.

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U.S. PIPE FOR WATER, SEWERAGE AND

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Our new "Tyton Joint" pipe assembles so easily even an inexperienced crew can master the technique quickly.

Only one accessory needed...a specially designed rubber gasket which seats in the bell. The entering pipe slides into place easily, compressing the gasket... making a tight, permanent seal.

No bell holes needed. What's more, "Tyton Joint" doesn't mind wet feet. You can lay it in the rain if need be!

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A WHOLLY INTEGRATED PRODUCER FROM MINES AND BLAST FURNACES TO FINISHED PIPE

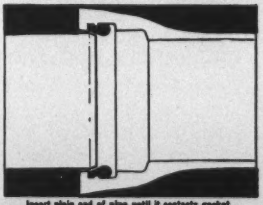
INDUSTRIAL SERVICE

TYTON

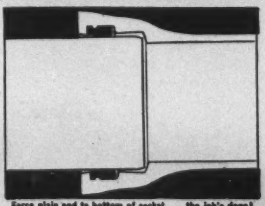
ONLY FOUR SIMPLE ACTIONS

Insert gasket with groove over bead in gasket seat

Wipe a film of special lubricant over inside of gasket



Insert plain end of pipe until it contacts gasket



Force plain end to bottom of socket . . . the job's done!

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is a quarterly publication, containing the papers read at the meetings, together with reports of the discussions. Many of the contributions are from writers of the highest standing in their profession. It affords a convenient medium for the interchange of information and experience between the members, who are so widely separated as to find frequent meetings an impossibility. Its success has more than met the expectation of its projectors; there is a large and increasing demand for its issues, and every addition to its subscription list is a material aid in extending its field of usefulness.

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Another point, LEADITE saves "interest charges" by speeding up the completion of the water line.

The true value of LEADITE is best indicated by the fact that it has been used on THOUSANDS OF MILES of Water Mains,—all over this Country, as well as in many Overseas Countries.

The Pioneer self-caulking material for c. i. pipe,
Tested and used for over 40 years,
Saves at least 75%.

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